

NOxFLASH



NOxFLASH TECHNOLOGY IMPROVES THE ENVIRONMENTAL ASPECTS

The **NOxFlash technology** is the result of an innovative approach to process design and has been proven in our installations since 2006. It is a purely process technical solution without use of filters or absorbents, which will always be sensitive to contamination.

The NOxFlash technology replaces the traditional use of scrubbing with PPM (potassium permanganate) solution, thereby reducing cost and environmental impact.

Among other advantages, the NOxFlash, in combination with the distillation column PUR, also optimises the process to yield the best possible CO₂ quality with very low amounts of inerts, aromatic hydrocarbon and NO_x. Furthermore, the NOxFlash acts as proven abatement of benzene (aromatic hydrocarbon) in

the final product. Thereby the NOxFlash offers a perfect solution, which performs without influence from combustion out of specification or variations in fuel composition.

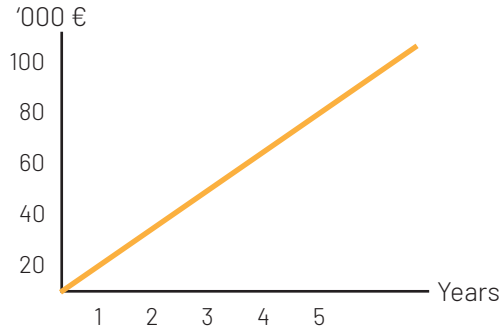
All Pentair Union Engineering generating plants are based on the latest technologies, including NOxFlash and PUR-D.

The NOxFlash technology is patented.

NOxFLASH BENEFITS

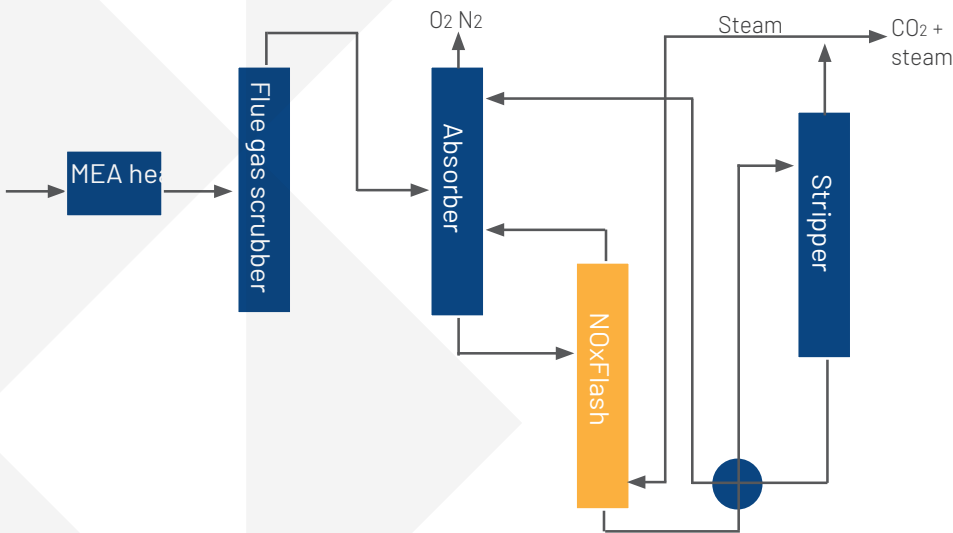
- Avoid the use of PPM and improve your environmental responsibility
- Significant savings on OPEX and changed CAPEX
- No liquid PPM emission at the plant site
- Reduced environmental impact
- Reduced MEA consumption
- Benzene and aromatic hydrocarbon abatement
- No hazardous liquid waste
- Reduced O₂ content in the final product when combined with Pentair Union Engineering purification system (PUR-D)
- Ultra-pure CO₂ product

AVERAGE SAVINGS WHEN NO_xFLASH IS IMPLEMENTED



Example Europe based on the following assumptions:	
Plant size:	1000 kg/h
PPM:	4,5 €/kg
Average disposal cost:	500 €/m ₃

CO₂ CAPTURE AND NO_xFLASH



GENERAL DESCRIPTION OF NO_xFLASH PROCESS

The plant is based on combustion of fuel in a MEA heater equipped with a burner. After the combustion, the flue gas will have a CO₂ content of 10-14% v/v and will exit the MEA heater at a temperature of approximately 250°C.

After cooling and scrubbing, the gas is led via an exhauster through an absorber, in which the gas flows counter-current to the MEA solution flow. By chemical reaction, the MEA solution absorbs the CO₂ from the flue gas. The MEA solution containing the absorbed CO₂ (referred to as rich MEA solution) is first pressurised and heated in a heat exchanger and then led to the NO_xFlash column. Here most of the contaminants are removed from the rich MEA solution by flashing to the absorber pressure.

Further heating is added to the bottom of the NO_xFlash column for further reduction of the contaminants in the MEA solution. This optimises the process yield to the best possible CO₂ product without any use of expensive chemicals (Pentair Union Engineering patent pending).

