

E-Gas™ Gasification Technology

Overview

The E-Gas™ Gasification Technology has been commercially operated for nearly 30 years, maintaining a state-of-the-art position in the gasification industry. The primary focus of the technology's development has always been an environmentally superior, safe and highly

efficient process to produce syngas for power generation, SNG, hydrogen, or chemical production from a range of solid fuels. The E-Gas Technology is unique in the industry as an experience-driven design due to Lummus Technology's heritage in operating companies.

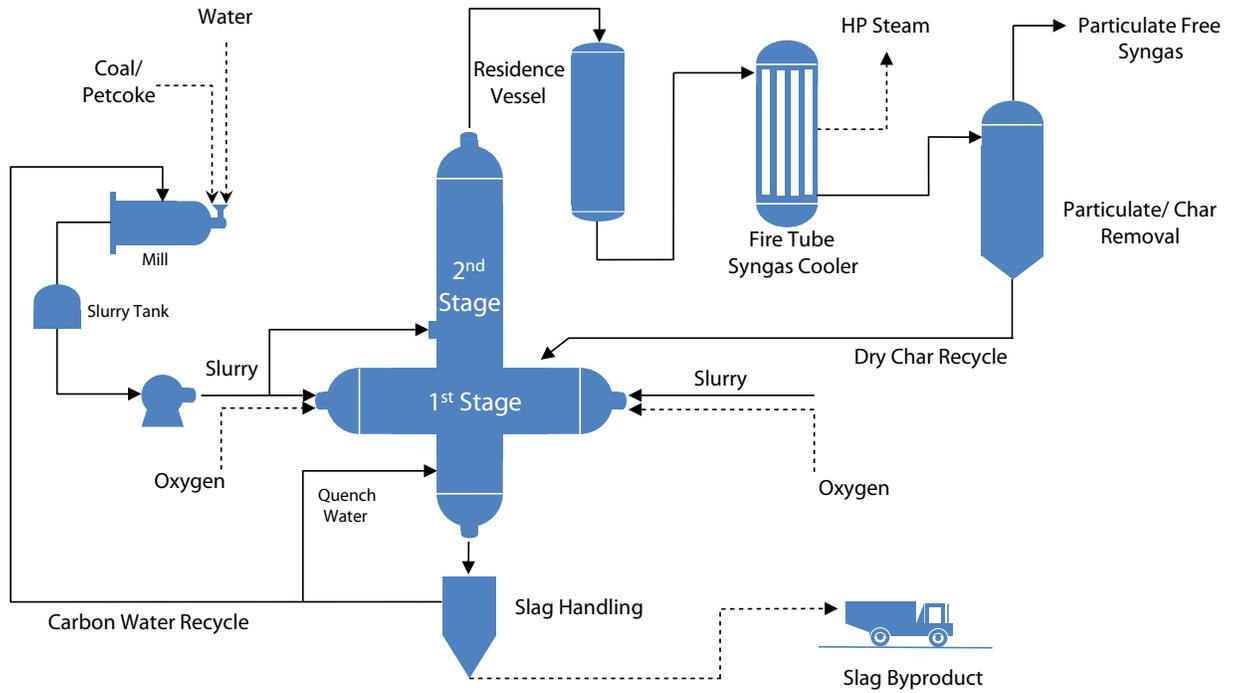
Advantages

Process Features	Process Benefits
Oxygen-blown, slurry fed entrained flow gasifier	Most robust gasification application, lower capital cost
Two stages of gasification	Higher carbon conversion, high thermal efficiency
Fuel Flexible	Operates on petcoke, bituminous coal, sub-bituminous coal and pitch blends
Dry char recycle	No wastewater generation, no carbon lost
Separate fire-tube syngas cooler with compact design	Generates HP steam at low cost
Continuous slag removal (no lock-hopper)	Improves operability and lowers structure height
Large single train capacities (3,000-4,000 metric tons/day capacity)	Fewer gasifiers lowers capital cost for the project
Permanently installed pre-heat burner	Added safety and operability during start-up or re-start

Performance Characteristics

- Special feed system facilitates high carbon conversion, with more than 99% total carbon conversion
- Permanently installed start-up burners maintain the gasifier in a hot and ready state for simple and safe start-up or restart
- Continuous, low profile slag removal system eliminates expensive, maintenance-prone lock hoppers and slag conveyors
- Patented two-stage gasifier design improves heating value of the syngas and energy efficiency while enhancing the fuel flexibility of the gasifier
- Unique fire tube syngas cooler minimizes the size and cost of heat recovery resulting in high thermal efficiencies while generating >100 bar steam as a valuable product
- Dry solid particulate removal and recycle system improves the carbon conversion efficiency and avoids the creation of black or gray water resulting in no wastewater created in the core gasification technology block
- Most of the water created or collected outside the gasification block is also recycled back to the gasifier, further increasing the carbon conversion efficiency and reduction of wastewater

Process Flow Diagram



Process Description

The E-Gas™ Gasification Technology features an oxygen-blown, continuous-slugging, two-stage entrained-flow gasifier reactor. Coal is ground with water in a rod mill to produce slurry. The slurry is combined with high purity oxygen in mixer nozzles and injected into the first stage of the gasifier reactor. High purity oxygen is supplied by an air separation unit which is supplied by others.

In the first stage, slurry undergoes a partial oxidation reaction at temperatures high enough to bring the ash in the solid fuel above its melting point. The fluid ash falls through a tap hole at the bottom of the first stage into a water quench, forming an inert vitreous slag. The slag is continuously removed and the carbon remaining in the slag water is separated and recycled back to the gasification section for further conversion.

The synthetic gas (syngas) flows to the second stage, where additional coal slurry is injected. This coal is pyrolyzed in an endothermic reaction with the hot syngas to enhance the heating value of the syngas and to improve overall efficiency.

The syngas then flows to the syngas cooler where heat recovery produces saturated high pressure steam. After exiting the syngas cooler, the particulates (char) in the syngas are removed in dry barrier filters. Char is recycled to the gasifier reactor where the carbon in the char is converted to syngas. Syngas is then scrubbed with water to remove chlorides. After splitting off a portion of the syngas for recycle, the scrubbed syngas leaves the E-Gas Gasification Technology battery limits for further processing.

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