

Chemicals: Application Focus

Ethylene Process (Hot Section)

Process Description

In the ethylene process (hot section), gas feedstocks (ethane, propane, blends) or liquid feedstocks (naphtha, gas oil) are cracked in a high temperature furnace (~800°C). Dilution steam is introduced into the furnace to favor the production of ethylene and also to reduce coke formation. The intense heat in the radiant section causes the hydrocarbon to undergo numerous chemical transformation reactions. The hot gas exits the radiant section and is quickly cooled to reduce the reactivity of effluent gas in exchangers and quenched to separate coke, solids and pyrolysis gasoline (pygas). It is then compressed and washed to remove acidic gases (CO₂ and H₂S). In the purification (cold) section, gases are dried and refrigerated via cold boxes to separate the various products (methane/hydrogen, ethylene, propylene, butadiene) by fractionation (distillation).

Ensure your feedstocks support daily production and final products meet quality standards.



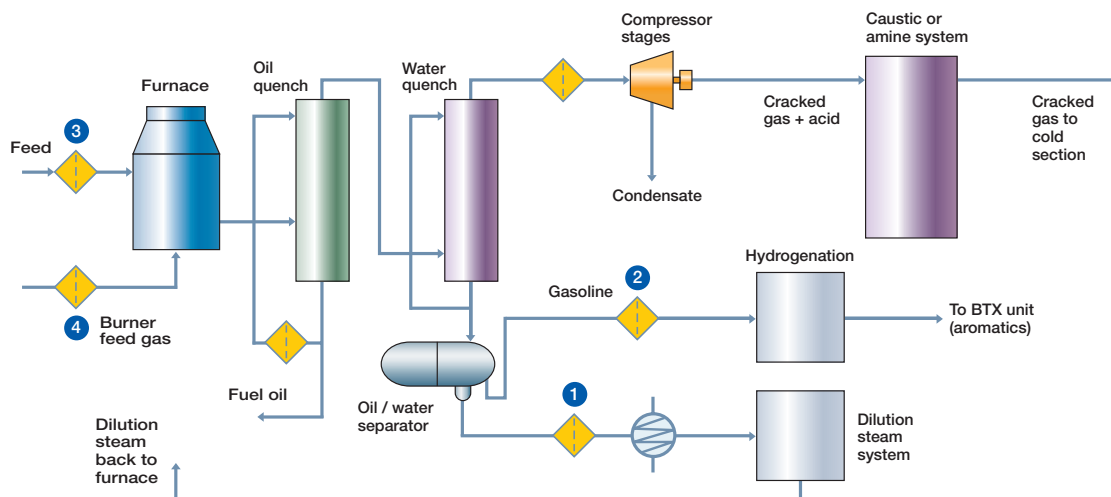
Chemical Plant Needs

- High efficiency coalescer usage results in guaranteed free pygas levels in quench water <20 ppm
- Effective removal of corrosion by products in feedstock feeds and if required, sodium in liquid feeds to furnaces <0.2 ppm
- Substantial removal of particulates and hydrocarbons in fuel/cracked gas with surface treated SeptraSol™ Plus coalescer to improve burner efficiency
- Longer process run times at lower risk of encountering upset process conditions

Production Challenge/Pall Solution

Challenge	Solution
Separate tar-like solids and stable emulsions of pygas and water to improve the quench water quality used in the dilution steam system (DSS)	Use of appropriate prefilters and process improvements to protect liquid/liquid coalescer in quench water applications. This will ensure long life of the prefilters and maximize coalescer performance.
Contaminants in the feed gas or liquid to furnaces must be removed to minimize coke formation	Removal of solids in gas and liquid feeds with highly efficient particulate filters. In some cases, removal of sodium in liquid feeds with proprietary liquid/liquid coalescers.
To improve furnace efficiency, burner tips must be protected from carbonaceous deposits	Use of surface treated liquid gas coalescer elements to remove hydrocarbons such as green oil from fuel gas to burners.

Process Flow Diagram



Key Applications/Filter Recommendations (other applications not shown)

Application	Pall Product	Advantages	Customer Benefits
1 Removal of pygas from quench water to make dilution steam.	For gas crackers, a combination of prefilters will typically include DFT Classic® + MCC1401E @ 10 µm + PhaseSep® L/L coalescer. For liquid crackers, usually one prefilter @ 10 µm to protect coalescer.	Remove tar-like solids and break stable emulsion of pygas/quench water. Reduce free pygas to <20 ppm in quench water.	The combination will ensure longer prefilter life and coalescer life ~ 1 year, resulting in savings on downstream maintenance cost (exchanger and steam generator)/ steam usage in strippers. It will reduce water treatment costs.
2 Removal of water from pygas before hydrogenation.	Prefilters such as MCC1401E or Coreless PPS @ 10 µm + PhaseSep® L/L coalescer.	Break the emulsion of water/pygas and ensure minimum water in product pygas.	Easier separation than in #1 above. Customer assured of on-spec pygas sent to hydrogenation reactor.
3 Removal of solids/ aqueous liquids from gas or liquid feeds to furnaces.	Filters for gas feeds are usually Coreless PPS @ 0.3 µm. For liquid feeds, Ultiplex® High Flow GF or MCC 1401E @ 10-20 µm as prefilters and if required, use PhaseSep L/L coalescer.	Remove solid iron sulfide/ oxide from feedstock with high efficiency filters and to remove sodium in water from liquid feeds with fluorocarbon coalescers.	Pall has extensive experience in removing solid and liquid contaminants in furnace feeds. Results in efficient furnace use with less decoking cycles at high throughput.
4 Protection of furnace burner tips.	SepraSol or SepraSol Plus L/G coalescer in fuel gas line. Medallion™ HP L/G coalescer is another option.	To mitigate fouling of burner tips. Premium surface treated or pleated Tier 2 L/G coalescer effectively removes solids and green oil in fuel gas to burners.	Customer benefits from significant improvement in furnace efficiency and less maintenance cost .

(Positions relate to flow diagram)



Pall Corporation

Fuels and Chemicals

25 Harbor Park Drive
Port Washington, NY 11050
+1 516 484 3600 telephone
+1 800 289 7255 toll free US

Portsmouth - UK
+44 (0)23 9233 8000 telephone
+44 (0)23 9233 8811 fax
www.pall.com/contact

Visit us on the Web at www.pall.com

Pall Corporation has offices and plants throughout the world. For Pall representatives in your area, please go to www.pall.com/contact

Because of technological developments related to the products, systems, and/or services described herein, the data and procedures are subject to change without notice. Please consult your Pall representative or visit www.pall.com to verify that this information remains valid.

© Copyright 2019, Pall Corporation. Pall, (PALL), AquaSep, DFT Classic, Medallion, PhaseSep, SepraSol, and Ultiplex are trademarks of Pall Corporation.

® Indicates a trademark registered in the USA. Better Lives. Better Planet. and Filtration. Separation. Solution.™ are service marks of Pall Corporation.

