

300 AREA

CRACKING

The cracking process is based on the thermal decomposition of EDC to yield vinyl chloride (VCl) and hydrogen chloride (HCl). The pyrolysis reaction takes place at elevated temperatures (about 950⁰F) and pressure (about 270 psig) in the tubes of a gas-fired cracking furnace. The gaseous reaction products are rapidly cooled and partially condensed by quenching with cooled liquid EDC and VCl in a quench column. This rapid cooling stops the cracking reaction. The quench column liquid stream (condensed vapors from the furnace) exits the bottom of the quench column and vapor stream (noncondensed vapors from the furnace) exits the top. The quench overhead (Vapor) is fed to a series of condensers that partially condense the vapors. Both of these streams, and the quench bottoms are fed to the cracking purification section and separated into VCl, HCl and unreacted EDC by fractional distillation.

The HCL is the first component to be separated from furnace products. It is removed from the top of the HCL column. EDC and VCM pass out of the bottom of the HCL column. The HCL is partially condensed and is consumed in the oxyhydrochlorination unit in the production of EDC. The VCM and EDC that are drawn off the bottom of the column are fed to the vinyl column.

The vinyl is separated from the EDC in the VCM column. The VCM is distilled to the top of the VCM column and partially condensed by a water cooled condenser. The condensed VCM is then pumped back to the column as reflux and the excess is pumped through caustic scrubbers to storage spheres. The caustic scrubbers remove trace amounts of HCL and moisture from the VCM product.

The unreacted EDC exits the bottom of the column and flows to the lights column. The lights column separates lights that are heavier than vinyl and lighter than EDC from this recycled EDC.

The furnace is operated to give about 50 percent conversion of EDC to vinyl and HCL. That is, if 100 pounds of EDC are fed to the furnace, 50 pounds will not react and return as recycled EDC. There will be about 28 pounds of VCl produced and about 22 pounds of HCL produced. The process produces VCl of at least 99.9 percent purity and HCL of at least 99.5 percent purity.

The purpose of the 300 area is to make VCM by cracking EDC. The furnace is where the cracking of the EDC takes place. The purpose of the HCL column is to separate the HCL from the furnace exit gasses. The VCM column separates the VCM from the unreacted EDC.

The following is a list of 300 area equipment names and corresponding numbers:

	NAME:	NUMBER:
1.	Natural Gas Filter	GF-351
2.	EDC Cracker	HF-301A/B
3.	Quench Tower	AS-301
4.	Quench Cooler	TT-300A/B
5.	Strainer ("A" Quench)	GF-300A/B
6.	Strainer ("A" Filtrate)	GF-311A/B
7.	Strainer ("B" Quench)	GF-313A/B
8.	Strainer ("B" Filtrate)	GF-312A/B
9.	Quench Vapor Condenser	TT-302A/B/C
10.	HCL Exchanger	TT-303

11.	Quench Vapor Separator	MS-301
12.	HCL Reboiler	TT-304A/B
13.	HCL Feed Strainer	GF-302
14.	HCL Column	AS-302
15.	HCL Reflux Condenser	TT-305
16.	HCl Reflux & Storage Vessel	MS-302
17.	R-134A Compressor	GR-301
18.	VCL Column	AS-303
19.	VCL Reboilers	TT-306A/B
20.	VCL Reflux Drum	MS-304
21.	VCL Reflux Condenser	TT-307
22.	HCL Stripper	MS-306
23.	VCL Scrubber	MS-305A/B/C
24.	VCL Coalescer	MS-312
25.	VCL Product Spheres	MF-601A/B
26.	PUMPS:	
	* "A" Quench Circulation pump	PP-300A/B
	* "A" Quench Filtration Pump	PP-311A/B
*	"B" Quench Filtration Pump	PP-312A/B
*	"B" Quench Circulation pump	PP-313A/B
*	HCL Reflux Pump	PP-302A/B
*	VCL Reflux Pump	PP-303A/B