

Ethanolamines/Glycol Ethers In Plant Training (IPT)

Section Number :4B
Issue Number :1.2
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Revision Date :12-09-94
Section Test :4B

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Ethanolamines - Ammonia System D-210 - E-210 - P-210 A/B

Answers:

1. **Physically locate.**

- A. P-210 recirculation control loop
- B. Anhydrous ammonia recirculation control loop
- C. T-220 overhead line to E-210
- D. D-210 ammonia control valve

2. **Explain the operation of D-210 and E-210.**

E-210 is a cooling tower water exchanger which cools down T-220 and D-218 overheads and removes the heat released when ammonia vapors are absorbed by water. Anhydrous ammonia is fed into D-210 to replace the ammonia used in the reactor. The P-210's pump D-210 bottoms back to the top of E-210 as recirculation. It is this flow which will absorb the vapors from T-220 and D-218 overheads. The P-210's also pump to the suction of the P-212's which pump aqua ammonia to the reactor, R-201. The level is controlled in D-210 by T-211 bottoms which joins in with D-210 bottoms recirculation to E-210. A vent is taken on D-210 to remove inerts, mainly nitrogen. This vent goes to E-211 or T-211 to and control the pressure in T-211.

3. **State what flows go into D-210 and E-210.**
Into D-210.

- A. Anhydrous ammonia from DS-205
- B. P-212 recirculation
- C. Hot condensate is piped up but only used at shutdowns

Into E-210.

- A. T-220 and D-218 overheads (mostly ammonia)
- B. Cooling tower water
- C. Recirculation from D-210 and T-211 bottoms

4. **Explain why an exchanger is needed to mix ammonia and water.**

When ammonia goes into solution with water, heat is released. E-210 removes this heat and helps keep the pressure low.

5. State to where the P-210 pumps.

P-210 pumps to the top of E-210 as recirculation and to the suction of the P-212's.

6. Explain what happens when the p-210 shuts down.

P-210 shuts down - there is no more flow to the top of E-210 which would pressure up D-210 because the ammonia vapor from T-220 and D-218 overheads would not be going into solution. Also, the P-212's would cavitate because the flow into their suction would be drastically reduced. The reactor would shut down and the P-212's would go on total recirculation, but would not shut down.

7. Explain why we take a vent off D-210 and what the vent is made up of.

The vent on D-210 is made up of ammonia and nitrogen vapors. We try too remove all the nitrogen from D-210 so that we won't get a false ammonia concentration reading. The nitrogen would cause D-210 to pressure up and give the appearance of more ammonia present than actual.

8. State where the vent from D-210 goes.

The vent from D-210 can go to E-211 or to T-211 or both and is used to maintain T-211 pressure as well as remove nitrogen from the system.

9. Explain how the level in D-210 is controlled.

The flow from T-211 bottoms controls the level in D-210. Since we are always taking out a flow through the P-212's to the reactor, we need to have a flow constantly making up to D-210. As the level in D-210 rises the flow from T-211 drops off. As the level in D-210 falls the flow from T-211 bottoms picks up.

10. State what type seals are used on P-210.

Tandem mechanical seals.

Revisions:

Revision No. 1	06-09-93	Yearly review
Revision No. 2	12-09-94	Yearly review