

Ethanolamines/Glycol Ethers In Plant Training (IPT)

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Ethanolamines/Glycol Ethers Process Familiarization - Utilities Nitrogen System

Answers:

1. **State what nitrogen is used for in the Ethanolamines/Glycol Ethers plant.**
Nitrogen is used as a pad on our storage and check tanks, used to provide the pressure to blow out lines and vessels and load and unload product, and used as a false feed on pressure controllers.
2. **Explain why it is used as a pad on the storage tanks.**
Nitrogen provides a good inert atmosphere which will lessen the chances of fire or explosion because it replaces the air (oxygen) normally needed for fire or explosion to occur. Nitrogen replacing air also reduces the air/product contact which can cause bad color in the amines products.
3. **Explain the advantage nitrogen has over air in breaking the vacuum on towers.**
Our towers are under a vacuum for the most part. When air is introduced into the tower while under vacuum it increases the chance of having a fire or explosion because at reduced pressures the vapor and flash point of most substances are lowered. Using nitrogen instead of air removes oxygen from the fire equation thus reducing the chances of a reaction. It is always best to break the vacuum slowly so as to not upset or blow the tower insides around.
4. **Explain why we use it as a false feed on the vacuum control systems.**
Same reason as above, to remove air from possibly getting into the towers. (We do use air in some instances.)

5. State the hazards associated with breathing nitrogen.

Breathing pure nitrogen will kill you immediately. The normal oxygen content of air is around 20 - 21 %. When the oxygen content is reduced, by nitrogen or some other inert gas, the following symptoms occur.

Oxygen Content	Symptoms
12 - 16%	Breathing and pulse rate increased, muscular coordination slightly disturbed
10 - 14%	Consciousness continues, emotional upsets, abnormal fatigue upon exertion, disturbed respiration
6 - 10%	Nausea and vomiting, inability to move freely, loss of consciousness may occur. May collapse and although aware of circumstances be unable to move or cry out.
Below 6%	Convulsive movements, gasping respiration. Respiration stops and a few minutes later, heat action ceases.

6. Describe what concerns you need to keep in mind when using an explosive meter in an atmosphere with higher than normal nitrogen levels.

Explosive meters need to have at least 19% oxygen to operate properly. In atmospheres with less than that amount, the meter will give a low reading or no reading, leading you to believe the atmosphere is safe for hot work when in fact it may not be. You should first check for oxygen content before checking for LEL.

7. Describe what you should do to the nitrogen line feeding a vessel or tank before going into that vessel or tank on a vessel entry.

Nitrogen lines need to be double blocked and bled, or better yet, disconnected, misaligned and/or blinded.

8. Describe those things you should check concerning nitrogen on your outside round.

Pressure downstream of the regulator at the block limits would let you know of a regulator malfunction. Also, regulators and valves feeding the pad system on our storage and check tanks should be checked.

9. Explain what should be used every place nitrogen is tied into a process line or any other type line or vessel.

A double block and bleed with a check valve to prevent back flow into the nitrogen line.

Revisions:

Revision No. 1	06-16-93	Yearly review
Revision No. 2	12-14-94	Yearly review