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Engineering solutions for people, by people

CONSER helps organizations achieve the highest standards of manufacturing excellence with an integrated comprehensive approach to process design and safety.

With over 45 years of experience in the industrial sector, CONSER is able to deliver innovative and creative solutions tailored to the client needs.

Some of the services provided by CONSER process department are basic design, Operation analysis, de-bottlenecking, revamping and R&D

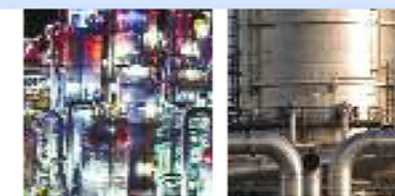
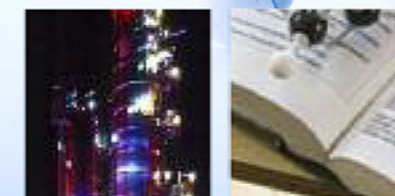
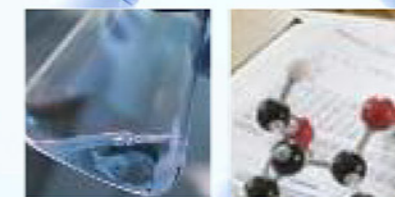
In addition to a unique portfolio of petrochemical licenses and technologies, CONSER is now able to provide additional industrial consulting services like HSE, Energy Saving opportunities, and solution for the mitigation of the environmental impact of plant operations

Leading the change in the process engineering design

CONSER, as an independent process engineering design company, is devoted to the build up and license of advanced technologies. We focus on processes development, driving forward to meet customer requirements. CONSER stands out in the scene of Italian process engineering companies for its faith in research, shown by its ceaseless investments in this field. The company reputation and success is confirmed by the excellent performances of the plants brought on stream following its design and the satisfaction of the clients that have chosen CONSER.

With the aim to provide a service with optimum quality characteristics, all the project phases are managed. Starting with feasibility studies, process development, licensing of processes and know-how transfer, process design package preparation, supervision of detailed engineering and construction, we follow our client up to and including assistance to initial start-up. This is valid both for new plants and for existing plants which requires debottlenecking to improve performances and enhance profitability.

Ethanolamines (MEA, DEA, TEA)



Ethanolamines - Process introduction

Ethanolamines, also known as MEA (Mono-Ethylamine), DEA (Di-EthylAmine) and TEA (Tri-Ethyl-Amine) are a colourless viscous liquid widely used in industry for the following applications:

- Agricultural applications
- Cement Grinding Additives
- Gas and Flue-gas treatment
- CCS (Carbon Capture and storage)
- Corrosion Inhibitors
- Detergents
- Emulsifiers
- Pharmaceutical applications

In CONSER technology, ethanolamines are produced by the non-catalytic reaction of ethylene oxide with aqueous ammonia.

The process is characterized by a high degree of flexibility, resulting in the possibility of producing mono-ethanolamide (MEA), di-ethanolamine (DEA) and tri-ethanolamine (TEA) of high quality with a wide range of products distribution.

Ethanolamines - Process features

The major characteristics of the CONSER process are:

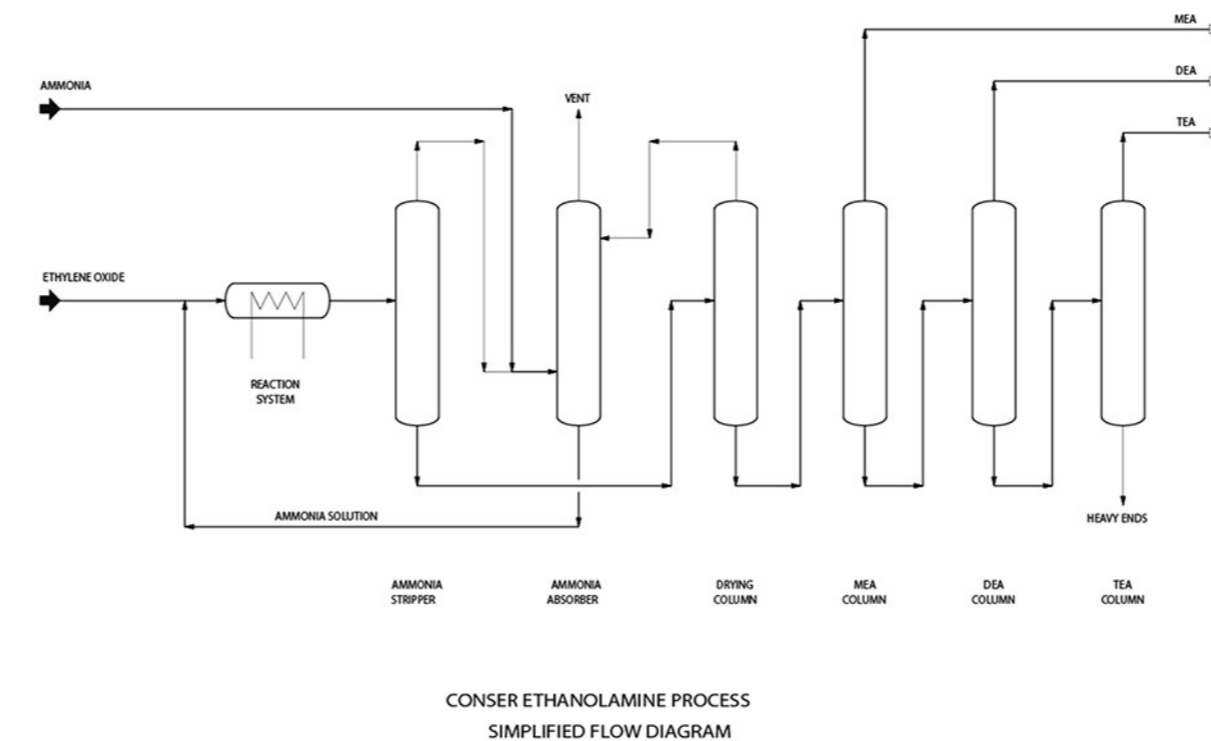
- High degree of plant flexibility and capacity
- Efficient raw material consumptions
- Low energy consumption (solvent recovery)
- Safe and reliable design
- High degree of contaminants removal



Ethanolamines - Experiences

CONSER has a complete experience in the development of Ethanolamines' technology and the execution of basis design of their production plants. CONSER experience in the Ethanolamines has been applied to the following cases:

Company	Location
HULS	Germany
BASF	Germany
SHELL	U.K.
NIHON	Japan
NAPHTACHEMIE	France
BRAZI	Romania
I.C.I.	U.K.
OXITENO	Brazil
TECHCORP	Iraq
J.C.I.G.	China
FUSHUN	China
OUCG	Taiwan



Process description

The ethanolamine technology of CONSER consists of the following main steps:

- Reaction
- Ammonia recovery and concentration
- Purification

Reaction section

Monoethanolamine (MEA), Diethanolamine (DEA) and Triethanolamine (TEA) are produced by the non-catalytic reaction of ethylene oxide with ammonia in aqueous solution.

Products distribution can be controlled by proper choice of the ethylene oxide/ammonia ratio in the reaction feed.

The higher the ratio of ammonia to oxide, the higher will be the amount of MEA in the reactor product. MEA, DEA and TEA distribution in the reactor product can be also modified by recycling some MEA and/or DEA to the reactor.

Ammonia recovery and concentration

The reactor effluent flows to an ammonia stripper where the excess ammonia is separated from the solution. The overhead vapours of the stripper are cooled and condensed and then fed to an ammonia absorption column. Fresh ammonia makeup is fed into the absorption column and both streams form the aqueous ammonia feed to the reactor. The ammonia free amines, in aqueous solution, are fed to an evaporation system where most of the water is removed. The water is recovered for use in the ammonia absorber.

Purification

The raw amines are fed to a drying column where the last fraction of water is removed. The dried amines are then separated in a train of distillation columns which produce the final mono-, di- and tri-ethanolamine products.

The system allows a high degree of flexibility in order to cope with the different production levels and requirements during the lifetime of the plant.