



Tulsion® Resin For Acetaldehyde Removal From Ethanol

Introduction

Acetaldehyde is a widespread, naturally occurring, colourless and flammable liquid with a suffocating smell. Acetaldehyde is found in various plants, ripe fruits, vegetables, cigarette smoke, gasoline and diesel exhaust. This substance is widely used in the manufacture of acetic acid, perfumes, dyes and drugs, as a flavouring agent and as an intermediate in the metabolism of alcohol. International Agency for Research on Cancer (IARC) has listed acetaldehyde as a group 1 carcinogen and hence, there is a need for acetaldehyde removal across many industries.

Challenges

Acetaldehyde is found in the air which causes a high risk of cancer. Those exposed to more acetaldehyde than normal through a genetic variant of the gene encoding for alcohol dehydrogenase are at greater risk of developing cancers of the upper gastrointestinal tract & liver. According to European Commission’s Scientific Committee on Consumer Safety’s (SCCS) opinion on acetaldehyde, the cosmetic products’ special risk limit is 5 mg/l and acetaldehyde should not be used in mouth-washing products. Acetaldehyde may cause skin allergy.

Thermax Solution

Thermax ion exchange resin team has developed new premium grade Tulsion products- Tulsion® ALD-207 and Tulsion®ALX-01(NR), to remove acetaldehyde from ethanol. The developed products can be categorised as regenerable & non-regenerable. Regenerable product is regenerated with a local chemical which is readily available in the market. Non-regenerable product is used when the treated quality of acetaldehyde content required is very low. Tulsion products can work in 16 %, 40%, 70%, 95% & 99% ethyl alcohol. Operating performance & outlet quality will depend on inlet acetaldehyde content.

Total exchange capacity	0.65 meq/ml
Moisture content	40 to 47%
Uniform coefficient	1.6
Particle size	0.3 to 1.2 mm
Functional group	Tri-butyl ammonium

Product Applications

PFOA/PFOS removal from ground water

This resin is used for the removal of perfluoroalkyl and polyfluoroalkyl compounds from ground water. It has higher capacity to remove alkyl long chain and short chain per-fluorinated compounds. It also has ability to reduce perfluoroalkyl or polyfluoroalkyl compounds to non- detectable level.

Perchlorate (ClO4-) removal from ground water

It works on perchlorate by capturing perchlorate anions on a positively charged resin and releasing a harmless chloride ion in its place. This resin has high selectivity and capacity for perchlorate. Second advantage of this resin is that it can capture perchlorate from brine solutions, allowing an additional application for secondary treatment of waste brine regenerant streams from IX systems which use non-selective resins to treat perchlorate contaminated drinking water.

Extracting gold from gold mines as its cyanide complex

Conventional strong base anion exchange resin used for gold recovery is unsuitable for extracting gold. Only strong base gold selective resin used for gold recovery from thiosulfate solution are suitable for cyanide solution.

Removal of nitrate

In drinking water applications, this resin typically removes nitrate from water during raw water treatment. It can yield operating capacity higher than conventional resins. These characteristics make Tulsion A-630 the perfect choice for a simple, regenerable, nitrate removal process for municipal water treatment.

Advantages

- Tulsion A-630 resin operates with higher specific velocities and shorter contact time than granular carbon.
- It is highly charged resin which exchange hydrophobic anions faster than regular anions.

Targeted Industries

- Teflon and other fluoro-polymer manufacturing industries.
- Oil refineries and air field industries.
- Rocket fuel, munitions, explosives and fireworks manufacturing industries.



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Registered Office

Thermax Limited
D-13, MIDC Industrial Area,
R D Aga Road, Chinchwad,
Pune 411 019, India
Email: enquiry@thermaxglobal.com
Customer Care: 1800-209-0115

Business Office

Environment House,
Plot No. 90-92, BG Block,
MIDC, Bhosari,
Pune, Maharashtra 411 026
Email: enquiry@thermaxglobal.com
Customer Care: 1800-209-0115

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