



# 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.

Tulsion®ALD-207	Tulsion®ALX-01 (NR)
Macroporous	Macroporous
Easily regenerable by cheaper regenerant	Non-regenerable
High operating capacity	High operating capacity
High surface area & pore volume	pH stability -at neutral or till 7.8
Active dry wet capacity	Defined porosity increase reaction kinetics
Outlet quality <10 ppm or nil	Outlet quality <1 ppm or nil

## Benefits

### Pharmaceuticals

In pharmaceutical industry, most of the products/drugs are washed by ethanol to remove impurities and due to which acetaldehyde content reacts with product/drug that generates other by-products which is not acceptable. Therefore, highest purity ethanol is required.

### GC Grade Ethanol

All types of industries have GC (Gas Chromatography) instrument which is used to detect and quantify the volatile compounds. These instruments require highest purity standard ethanol. If acetaldehyde content is higher in ethanol then, it will give unfavourable results due to tautomer of vinyl alcohol. Therefore, highest purity ethanol is useful for such type of instrumental analysis.

### Corona Virus (COVID-19)

Last year, due to covid-19 virus, people throughout the world used hand sanitizers. They are made from ethanol having acetaldehyde content which is varying from 100 to 1000 ppm. In this scenario, USFDA has announced that acetaldehyde content <50 mg/l will be standard for hand sanitizer (in ethanol). Research says that acetaldehyde can be absorbed through the skin pores which is hazardous and can pose various health problems.

## Areas of Application

- Sugar industries (Ethanol manufacturer)
- Chemical & pharmaceuticals
- Wine & beverages industries
- Cosmetic industries



Air Pollution Control



Boiler and Heater



Build-Own -Operate



Chemical



Cooling



Projects and Energy Solutions



Process Heating



Renewable Energy



Water and Waste Solutions






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