ETHYL ALCOHOL

Prepared at the 46th JECFA (1996), published in FNP 52 Add 4 (1996) superseding specifications prepared at the 29th JECFA (1985), published in FNP 34 (1986. An ADI limited by GMP was established at 14th JECFA (1970))

SYNONYMS Alcohol, ethanol

DEFINITION Contains usually about 95% v/v (i.e. with about 5% v/v water) C_2H_6O; other grades with a different water content may be used depending on the technological requirements; these specifications apply only to undenaturated ethyl alcohol.

Chemical names Ethanol

C.A.S. number 64-17-5

Chemical formula C_2H_6O

Structural formula 

Formula weight 46.07

Assay Not less than 94.9% v/v

DESCRIPTION Clear colourless mobile liquid with a mild characteristic odour; flammable

FUNCTIONAL USES Extraction solvent, carrier solvent, flavouring agent (see "Flavouring agents" monograph JECFA no. 41)

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Soluble in water

Refractive index (Vol. 4) n (20, D): 1.364

Boiling point (Vol. 4) 78º

Infrared absorption The infrared spectrum of the sample corresponds with the reference infrared spectrum below

PURITY

Solubility Transfer 50 ml of the sample to a 100 ml glass-stoppered graduated cylinder, dilute to 100 ml with water, and mix. Place the cylinder in a water bath maintained at 10º, and allow to stand for 30 min. No haze or turbidity develops.

Non-volatile residue (Vol. 4) Not more than 2 mg/100 ml

Acidity	Not more than 0.005% w/v as acetic acid Transfer 10 ml of the sample to a glass-stoppered flask containing 25 ml of water, add 0.5 ml of phenolphthalein TS. Add 0.02N sodium hydroxide until the first appearance of a pink colour that persists after shaking for 30 sec. Add 25 ml (about 20 g) of the sample, mix, and titrate with 0.02N sodium hydroxide until the pink colour is restored. Not more than 1.0 ml is required.
Alkalinity	Not more than 0.003% as ammonia Add 2 drops of methyl red TS to 25 ml of water. Add 0.02N sulfuric acid until a red colour just appears, then add 25 ml (about 20 g) of the sample, and mix. Not more than 2.0 ml of 0.02N sulfuric acid is required to restore the red colour.
Fusel oil	Mix 10 ml of the sample with 1 ml of glycerol and 1 ml of water, and allow to evaporate from a piece of clean, odourless absorbent paper. No foreign odour is perceptible when the last traces of ethanol leave the paper.
Ketones and other alcohols	Total: Not more than 0.5% Methanol: Not more than 0.02% Other: Not more than 0.1% See description under TESTS
Readily carbonizable substances	Transfer 10 ml of sulfuric acid into a small Erlenmeyer flask, cool to 10º, and add 10 ml of the sample, dropwise, with constant agitation. The mixture is colourless or has no more colour than either the acid or sample before mixing.
Readily oxidizable substances	Transfer 20 ml of the sample, previously cooled to 15º to a glass-stoppered cylinder, add 0.1 ml of 0.1N potassium permanganate, mix and allow to stand for 5 min. The pink colour is not entirely discharged.
Lead (Vol. 4)	Not more than 0.5 mg/kg Determine using an atomic absorption technique appropriate to the specified level. The selection of sample size and method of sample preparation may be based on the principles of the method described in Volume 4, “Instrumental Methods.”

TESTS

PURITY TESTS

Ketones and other alcohols	Proceed as directed under *Gas Liquid Chromatography* (Volume 4) using the following conditions: Column - length: 1.80 m - diameter: 6.4 mm - material: steel - packing: P.E.G. 400 10% - support: Chromosorb W 60/80 Carrier gas: Helium

Flow rate: 45 ml/min
Detector type: FID
Temperatures
- injection port: 150º
- column: 90º
- detector: 150º

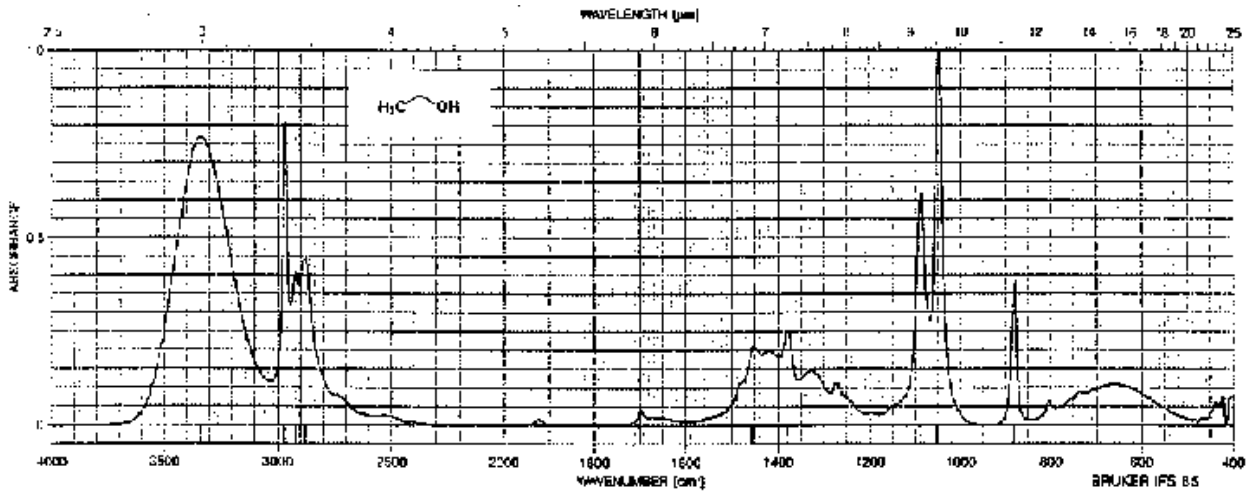
Inject 5 µl of the sample. The sum of areas of the peaks other than that of ethyl alcohol is not more than 0.5% of the sum of total peaks. The area of peak of methanol is not more than 0.02% and the area of any other individual peak of impurities is not more than 0.1% of the total.

METHOD OF ASSAY

The specific gravity of the sample is not higher than 0.8096 at 25º/25º (equivalent to 0.8161 at 15.56º/15.56º).

Infrared spectrum

Ethyl alcohol



Infrared spectrum from Merck FT-IR Atlas through courtesy of Dr. K.G.R. Pachler, Mr. F. Matlok and Dr. H-U. Gremlich, c/o Merck, Darmstadt, and VCH Verlagsgesellschaft GmbH, Weinheim, Germany.