1,1,2-TRICHLOROTRIFLUOROETHANE

Prepared at the 26th JECFA (1982), published in FNP 25 (1982) and in FNP 52 (1992). Metals and arsenic specifications revised at the 63rd JECFA (2004). No ADI was allocated at the 23rd JECFA (1979)

SYNONYMS Fluorocarbon 113

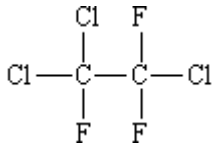
DEFINITION

Chemical names 1,1,2-Trichloro-1,2,2-trifluoroethane

C.A.S. number 76-13-1

Chemical formula $C_2Cl_3F_3$

Structural formula



Formula weight 187.4

Assay Not less than 99.8%

DESCRIPTION Colourless, volatile liquid with a faint characteristic odour

FUNCTIONAL USES Extraction solvent

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) Practically insoluble in water; miscible with ethanol, chloroform and ether

Refractive index (Vol. 4) n (20, 20): about 1.359

Specific gravity (Vol. 4) 1.571 - 1.578

Boiling range (Vol. 4) 47.0 - 48.0°

PURITY

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

Free chlorine Not more than 5 mg/kg (as hydrochloric acid)
Shake 10 ml of the sample vigorously for 2 min, with 10 ml of 10% potassium iodide solution and 1 ml of starch TS. A blue colour does not appear in the water layer

Acidity Not more than 0.5 mg/kg
Shake 20 ml with 20 ml of freshly boiled and cooled water for 3 min.

Separate the aqueous layer and add a few drops of bromocresol purple indicator solution. Not more than 0.3 ml of 0.01 N NaOH is required to change the colour of the indicator.

Other halogenated hydrocarbons

Not more than 0.2%
See description under TESTS

Lead (Vol. 4)

Not more than 2 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

Other halogenated hydrocarbons

Examine by *gas chromatography* using the following solutions:
- Trichlorotrifluoroethane to be examined
- A 0.2% (v/v) solution of 2-bromo-2-chloro-1,1,1-trifluoroethane (halothane) in ethanol as internal standard.

The chromatographic procedure is carried out under the following conditions:
Column
- length: 2.75 m
- diameter: 0.5 cm (i.d.)
- packing: the first 1.80 m: 30% PEG 400 supported on pink firebrik; the remainder with 30% dinonylphthalate on the same support.

Carrier gas: Nitrogen
Detector type: F.I.D.
Temperatures
- column: 50^{o}

Record the chromatogram with the appropriate attenuation and measure the area of all peaks and summate. The sum of the total impurities is less than 0.2%.
The chromatographic procedure may also be carried out with a column prepared with Porapak Q 130.

METHOD OF ASSAY

Determine by *Gas-liquid chromatography* (see Volume 4): After determination of the total content of specified impurities, the balance consists of 1,1,2-trichloro-trifluoroethane together with any trace of other halogenated hydrocarbons that may be present. Calculate the percentage of 1,1,2-trichlorotrifluoroethane by the formula 100%-X, in which X is the percentage of other halogenated hydrocarbons determined as directed above.