

SNAP CODE: 040504

SOURCE ACTIVITY TITLE: PROCESSES IN ORGANIC CHEMICAL INDUSTRIES
(BULK PRODUCTION)
Vinylchloride

NOSE CODE: 105.09.58

NFR CODE: 2 B 5

1 ACTIVITIES INCLUDED

Most vinylchloride is produced in the balanced process (see chapter B455). An alternative route is the addition of HCl to acetylene.

2 CONTRIBUTION TO TOTAL EMISSIONS

The NMVOC emissions of vinylchloride plants contribute according to Corinair 90 on average 0.02% to the total NMVOC emission in the reporting countries.

Table 2.1: Contribution to total emissions of the CORINAIR90 inventory (28 countries)

Source-activity	SNAP-code	Contribution to total emissions [%]							
		SO ₂	NO _x	NMVOC	CH ₄	CO	CO ₂	N ₂ O	NH ₃
Vinylchloride	040504	-	-	0	-	0	-	-	-

0 = emissions are reported, but the exact value is below the rounding limit (0.1 per cent)

- = no emissions are reported

This activity is not believed to be a significant source of PM_{2.5} (as of December 2006).¹

3 GENERAL

3.1 Description

HCl and an acetylene containing mixture are fed to a reactor containing Hg₂Cl₂ on carbon as catalyst. Reactor operation conditions are: T: 150 - 180°C; p: 500 - 1500 kPa.

Mixtures of acetylene and ethylene can be fed to the reactor, since ethylene does not react under the operation conditions used.

3.2 Definitions

Not relevant

¹ Updated with particulate matter details by: Mike Woodfield, AEA Technology, UK, December 2006

3.3 Techniques

See section 3.1

3.4 Emissions

Emissions from a vinylchloride plant are mainly NMVOC.

3.5 Controls

The fugitive emissions can be abated by use for instance by better types of seals and application of double seals near pumps.

4 SIMPLER METHODOLOGY

Use of an overall emission factor for the vinylchloride production emissions. The amount of emitted VOC is then directly related to the vinylchloride production.

The World Bank handbook gives some figures for that.

5 DETAILED METHODOLOGY

A more detailed methodology is used by the United States EPA.

Instead of one emission factor for the whole plant, emission factors for each piece of equipment, like valves, flanges, etc., can be used. Each type of equipment has its own emission factor. The total emission factor for the plant can be calculated by multiplying each equipment emission factor by the number of pieces of that type of equipment. So, for this method it is necessary to know how many pieces of each type of equipment are present in the plant.

6 RELEVANT ACTIVITY STATISTICS

Table 6.1.: Vinylchloride production in some countries and regions for 1990 :

Country or Region	kton/y	source
U.S.A.	4826	Chem&EngNews 29/6/92

7 POINT SOURCE CRITERIA

Vinylchloride production plants can be considered as point sources.

8 EMISSION FACTORS, QUALITY CODES AND REFERENCES

The World Bank Handbook gives an emission factor of 0.02 – 2.5 kg per metric ton product, depending on the quality of the abatement methods applied. The quality code might be B or C.

9 SPECIES PROFILE

According to the World Bank Handbook the VOC emissions from vinylchloride production should be 45 % ethylenedichloride , 20 % vinylchloride , and 15 % other chlorinated hydrocarbons and 20 % other hydrocarbons.

10 UNCERTAINTY ESTIMATES

The emission factors given should be used as default values with the appropriate accuracy.

11 WEAKEST ASPECTS/PRIORITY AREAS FOR IMPROVEMENT IN CURRENT METHODOLOGY

Not relevant.

12 SPATIAL DISAGGREGATION CRITERIA FOR AREA SOURCES

Not relevant.

13 TEMPORAL DISAGGREGATION CRITERIA

The plants are operated in continuous flow, thus no variation in emissions diurnally or seasonally is expected to occur.

14 ADDITIONAL COMMENTS

No additional comments

15 SUPPLEMENTARY DOCUMENTS

No supplementary documents

16 VERIFICATION PROCEDURES

Verification of the emissions can be done by comparing with measurements in the individual plant or by setting up a mass balance over the entire plant.

17 REFERENCES

1. World Bank group. Pollution Prevention and Abatement Handbook. Petrochemicals manufacturing Page 371 and 372 (1998)

18 BIBLIOGRAPHY

- Kirk-Othmer, Encyclopedia of chemical technology, Volume 23, third edition (1983).
- Winnacker-Küchler, Chemische Technologie, Organische Technologie II, Band 6 4. Auflage (1982) (in German).

19 RELEASE VERSION, DATE AND SOURCE

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20. POINT OF ENQUIRY

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