

## Gasutsläpp på en plastfabrik.

870726 MARS 1987\_02

Olyckan inträffade på en fabrik för produktion av olika plastmaterial. Ungefär 4 ton vinylklorid släpptes ut då en flänsförsegling brast. En fjärdedel av mängden kom in i fabriksbyggnaden och vidare ut genom taket till öppen luft. Den resterande mängden försvann direkt ut i atmosfären. Fabriksbyggnaden och senare även hela anläggningen utrymdes. Processuppvärmningen stängdes av och kylningen sattes på. Läckan åtgärdades.

### Inblandade ämnen och mängder

	CAS Nr.	Mängd
vinylklorid	75-01-4	4000 kg

### Skador:

Människor: Inga.  
Materiella: Inga.  
Miljö/ekologi: Inga effekter rapporterade.  
Infrastruktur: Inga.

### Erfarenheter redovisade (Ja/Nej): Ja

Kortfattat anges förebyggande åtgärder.

## Report Profile

### Identification of Report:

country: FA ident key: 1987\_002\_01

reported under Seveso I directive as major accident reports: SHORT+FULL

### Date of Major Occurrence: Time of Major Occurrence

start: 1987-07-26 start:

finish: finish:

### Establishment:

name:

address:

industry: 2001 general chemicals manufacture

Organic Chemical (Plastic Materials Production)

Seveso II status: not applicable: Yes art. 6 (notification): No

art. 7 (MAPP): No

art. 9 (safety report): No

### Date of Report:

short: full:

### Authority Reporting:

name:

address:

### Authority Contact:

rep\_cont\_name:

rep\_cont\_phone:

rep\_cont\_fax:

**Additional Comments:**

a) - not applicable -

b) - not applicable -

c) - not applicable -

d) - not applicable -

e) - not applicable -

## Short Report

country: FA ident key: 1987\_002\_01

**Accident Types:**

release: Yes explosion: No

water contamination: No other: No

fire: No

**description:**

SAFETY SYSTEMS OR OPERATORS INTERVENTION:... see Appendix Short Report / description of accident types

**Substance(s) Directly Involved:**

toxic: Yes explosive: Yes

ecotoxic: No other: No

flammable: Yes

**description:**

- Vinylchloride (C.A.S. CODE: 75-01-4): amount involved = 4,000 kg.

**Immediate Sources of Accident:**

storage: No transfer: No

process: Yes other: No

**description:**

The accident occurred during normal operation of a polymerization reactor (autoclave) in an organic chemical industry for the plastic materials production. The component involved was a flange in the pipeline connection from the autoclave to... see Appendix Short Report / description of immediate sources

**Suspected Causes:**

plant or equipment: Yes environmental: No

human: No other: No

**description:**

CAUSES:... see Appendix Short Report / description of suspected causes

**Immediate Effects:**

material loss: Yes

human deaths: No

human injuries: No community disruption: No

**other:** No

**ecological harm:** No

**national heritage loss:** No

**description:**

MATERIAL LOSS:

The accident caused small damages to the plant.

### **Emergency Measures taken:**

**on-site systems:** Yes **decontamination:** No

**external services:** No **restoration:** No

**sheltering:** No **other:** No

**evacuation:** Yes

**description:**

INTERNAL TO THE ESTABLISHMENT:... see Appendix Short Report / description of emergency measures taken

### **Immediate Lessons Learned:**

**prevention:** Yes **other:** No

**mitigation:** No

**description:**

MEASURES TO PREVENT ANY RECURRENCE OF SIMILAR ACCIDENTS:... see Appendix Short Report / description of

immediate lessons learned

## **A Occurrence Full Report**

**country:** FA **ident key:** 1987\_002\_01

### **1 Type of Accident**

**remarks:** The rupture of a seal in the pipeline connection from the autoclave to the

rupture disk caused the release of about 4 tonnes of vinylchloride (code

1101). About 1 tonne of vinylchloride passed through it into the production

hall and from th... see Appendix Full Report A / type of accident

### **2 Dangerous Substances**

**remarks:** The total establishment and the potential directly involved inventories of

vinylchloride refer to the amount released during the accident.

### **3 Source of Accident**

**illustration:** - not applicable -

**remarks:** The accident occurred during normal operation of a polymerization reactor

(autoclave) in an organic chemical industry for the plastic materials

production (codes 3101 and 2001). The component involved was a flange (code

4011) in the pipelin... see Appendix Full Report A / source of accident -

remarks

### **4 Meteorological Conditions**

**precipitation none: fog: rain: hail: snow:**

No No No No No

**wind speed (m/s):**

**direction (from):**

**stability (Pasquill):**

**ambient temperature (°C):**

**remarks:** - not applicable -

## 5 Causes of Major Occurrence

**main causes**

**technical / physical** 5102 operation: component/machinery failure/malfunction

- not applicable -

- not applicable -

- not applicable -

- not applicable -

**human / organizational** 5307 organization: process analysis (inadequate, incorrect)

5308 organization: design of plant/equipment/system (inadequate,

inappropriate)

- not applicable -

- not applicable -

- not applicable -

**remarks:** The vinylchloride leakage was caused by the defective seal of the flange (code 5102) in the connection pipeline from the autoclave to the rupture disk. The seal failure was caused by both inadequate process analysis and component design (co... see Appendix Full

Report A / causes of major occurrence

## 6 Discussion about the Occurrence

- not applicable -

**Type of Accident** country: FA ident key: 1987\_002\_01

**event:**

**major occurrence** 1101 release: gas/vapour/mist/etc release to air

**initiating event** 1101 release: gas/vapour/mist/etc release to air

**associated event** - not applicable -

## Dangerous substances

country: FA ident key: 1987\_002\_01

### a) total establishment inventory

**CAS number:** 75-01-4 **identity:** Vinylchloride

**name from Seveso I Directive:** - not applicable -

**name from Seveso II Directive:** - not applicable -

**category from Seveso II:** - not applicable -

**other hazards (1):** - not applicable -

**other hazards (2):** - not applicable -

maximum quantity (tonnes): 4

use of substance as: STARTING MATERIAL

**b) substance belongs to relevant inventory directly involved:** Yes

actual quantity: 4 potential quantity: 4

**c) substance belongs to relevant inventory indirectly involved:** No

actual quantity: -1 indir\_pot\_quant: -1

**Source of Accident - Situation** country: FA ident key: 1987\_002\_01

## situation

industry

initiating event 2001 general chemicals manufacture

associated event - not applicable -

activity/unit

major occurrence 3101 process: chemical batch reaction

initiating event 3101 process: chemical batch reaction

associated event - not applicable -

component

major occurrence 4011 general pipework/flanges

initiating event 4011 general pipework/flanges

associated event - not applicable -

## B Consequences Full Report

country: FA ident key: 1987\_002\_01

### 1 Area concerned

affected

extent of effects installation: Yes

establishment: Yes

off-site; local: No

off-site; regional: No

off-site; transboundary: No

illustration of effects - not applicable -

remarks In the Original Report there is no evidence of significant effects outside the e... see Appendix

Full Report B / area concerned - remarks

### 2 People

establishment popul. emergency personnel off-site population

total at risk

immediate fatalities

subsequent fatalities

hospitalizing injuries

other serious injuries

**health monitoring**

**remarks** No people were injured during the accident.

### **3 Ecological Harm**

**pollution/contamination/damage of:**

- residential area (covered by toxic cloud) Suspected
- common wild flora/fauna (death or elimination) Suspected
- rare or protected flora/fauna (death or elimination) Suspected
- water catchment areas and supplies for consumption or recreation Suspected
- land (with known potential for long term ecological harm or Suspected

preventing human access or activities)

- marine or fresh water habitat Suspected
- areas of high conservation value or given special protection Suspected

**remarks** In the Original Report there is no evidence of significant ecological harms.... see Appendix

Full Report B / ecological harm

### **4 National Heritage Loss**

**effects on:**

- historical sites not applicable - historic monuments not applicable
- historic buildings not applicable - art treasures not applicable

**remarks** No data available.

### **5 Material Loss**

**establishment losses off site losses**

**costs (direct costs to operator) (social costs)**

**in ECU ECU**

**material losses**

**response, clean up, restoration**

**remarks** The accident caused small damages to the plant.

### **6 Disruption of Community Life**

**establishment/plant evacuated disabled/unoccupiable destroyed**

- nearby residences/hotels No No No
- nearby factories/offices/small shops No No No
- schools, hospitals, institutions No No No
- other places of public assembly No No No

**interruption of utilities etc. no / yes duration**

- gas No
- electricity No
- water No
- sewage treatment works No
- telecommunications No

- **main roads** No

- **railways** No

- **waterways** No

- **air transport** No

**significant public concern** none local level national level

- **off site populations** Yes No No

- **media interest** No No No

- **political interest** No No No

**remarks** In the Original Report there is no evidence of significant effects outside the e... see Appendix

## 7 Discussion of Consequences

- not applicable -

# C Response Full Report

**country:** FA **ident key:** 1987\_002\_01

## 1 Emergency Measures

**taken - on site** - not applicable - - not applicable -

- not applicable - - not applicable -

- not applicable - - not applicable -

- **off site** - not applicable - - not applicable -

- not applicable - - not applicable -

- not applicable - - not applicable -

**still - on site** - not applicable - - not applicable -

**required**

- not applicable - - not applicable -

- not applicable - - not applicable -

- **off site** - not applicable - - not applicable -

- not applicable - - not applicable -

- not applicable - - not applicable -

**continuing contamination or danger**

**-on site** not applicable

**-off site** not applicable

**remarks** - not applicable -

## 2 Seveso II Duties

**pre-accident evaluation**

**Article item not due yet not done done/submitted evaluated**

**6 notification** No No No No

**7 policy (MAPP)** No No No No

**9 safety report** No No No No

9, 10, 11 update No No No No

11 internal plan No No No No

11 external plan No No No No

13 informing public No No No No

9, 12 siting policy No No No No

post-accident evaluation

Seveso II duty was actual were actual compared with actual

contingency consequences consequences, the

addressed? addressed? predicted extent was?

Article item

7 policy (MAPP) not applicable not applicable not applicable

9 current safety report not applicable not applicable not applicable

11 internal plan not applicable not applicable not applicable

11 external plan not applicable not applicable not applicable

13 informing public not applicable not applicable not applicable

9, 12 siting policy not applicable not applicable not applicable

evaluation of safety organisation

organisational element element existed did element relate to actual circumstances of

yes / no no / partly / yes adequate?

- written policy objectives No

- specified management No

structure

- specified responsibilities No

- specified working procedures No

- specified procedures for No

assessment/auditing of

management system

- specified procedures for No

review and update of

management policy

- specified general training No

procedures

- specified emergency No

training procedures

evaluation of ecological impact control

organisational element element existed did element relate to actual circumstances of

yes / no no / partly / yes adequate?

- ecological status review No

before incident

- potential ecological No



**consequences assessment**

- **ecological impact review** No

**after incident**

- **ecological restoration** No

**procedures**

- **subsequent review of** No

**restoration success**

**remarks** - not applicable -

### **3 Official Action Taken**

**legal action**

- not applicable -

**other official action**

- not applicable -

### **4 Lessons Learned**

**measures to prevent recurrence**

After the accident the followi... see Appendix Full Report C / lesson learned - prevent

**measures to mitigate consequences:**

- not applicable -

**useful references:**

- not applicable -

### **5 Discussion about Response**

- not applicable -

## **Appendices for the FA / 1987\_002\_01 report**

#### **Appendix Short Report / description of accident types:**

**SAFETY SYSTEMS OR OPERATORS INTERVENTION:**

Evacuation of the production hall. Interruption of the heating process and start up of the cooling system. Opening of the by-pass valves. Plant evacuation. Sealing of the flange connection.

**ACCIDENT CASE HISTORY DESCRIPTION:**

The rupture of a seal in the pipeline connection from the autoclave to the rupture disk caused the release of about 4 tonnes of vinylchloride. About 1 tonne of vinylchloride passed through it into the production hall and from there, through the roof, to the open air. Remaining 3 tonnes of vinylchloride escaped into the open air via the by-pass line. Process heating was interrupted and the cooling system was started up. Initially, the production hall was evacuated, later the whole plant.

#### **Appendix Short Report / description of immediate sources:**

The accident occurred during normal operation of a polymerization reactor (autoclave) in an organic chemical industry for the plastic materials production. The component involved was a flange in the pipeline connection from the autoclave to the rupture disk.

#### **Appendix Short Report / description of suspected causes:**

**CAUSES:**

The vinylchloride leakage was caused by the defective seal of the flange in the connection pipeline from the autoclave to the rupture disk. The seal failure was caused by both inadequate process analysis and component design.

#### **Appendix Short Report / description of emergency measures taken:**

**INTERNAL TO THE ESTABLISHMENT:**

Evacuation of the production hall. Interruption of the heating process and start up of the cooling system. Opening of the by-pass valves. Plant evacuation. Sealing of the flange connection.

#### **Appendix Short Report / description of immediate lessons learned:**

**MEASURES TO PREVENT ANY RECURRENCE OF SIMILAR ACCIDENTS:**

After the accident the following measures were established:

- 1- modification of the man-hole cover (use of bayonet shutters instead of a flange connection);
- 2- interlocking of vinylchloride dosage device with the man-hole cover so that the dosage device remains closed until the man-hole is perfectly closed;
- 3- control of seals after every charge;
- 4- filling the ring groove with water to allow the early identification of leaks by bubble formation.

**Appendix Full Report A / type of accident:**

The rupture of a seal in the pipeline connection from the autoclave to the rupture disk caused the release of about 4 tonnes of vinylchloride (code 1101). About 1 tonne of vinylchloride passed through it into the production hall and from there, through the roof, to the open air. Remaining 3 tonnes of vinylchloride escaped into the open air via the by-pass line.

**Appendix Full Report A / source of accident - remarks:**

The accident occurred during normal operation of a polymerization reactor (autoclave) in an organic chemical industry for the plastic materials production (codes 3101 and 2001). The component involved was a flange (code 4011) in the pipeline connection from the autoclave to the rupture disk.

**Appendix Full Report A / causes of major occurrence:**

The vinylchloride leakage was caused by the defective seal of the flange (code 5102) in the connection pipeline from the autoclave to the rupture disk. The seal failure was caused by both inadequate process analysis and component design (codes 5307 and 5308)

**Appendix Full Report B / area concerned - remarks:**

In the Original Report there is no evidence of significant effects outside the establishment.

**Appendix Full Report B / ecological harm:**

In the Original Report there is no evidence of significant ecological harms.

**Appendix Full Report B / disruption of community life:**

In the Original Report there is no evidence of significant effects outside the establishment.

**Appendix Full Report C / lesson learned - prevent:**

After the accident the following measures were established:

- 1- modification of the man-hole cover (use of bayonet shutters instead of a flange connection);
- 2- interlocking of vinylchloride dosage device with the man-hole cover so that the dosage device remains closed until the man-hole is perfectly closed;
- 3- control of seals after every charge;
- 4- filling the ring groove with water to allow the early identification of leaks by bubble formation.