

# Brand på en anläggning för produktion av gummi och plast.

970315

Vid torkning av en co-polymer fattade denna eld, troligen till följd av överhettning. Eventuellt kan en gnista startat branden. Rökgaserna spred sig i lokalen och ut i omgivningen. Räddningstjänsten larmades omedelbart. Larmet spreds sedan till mer avlägsna räddningstjänststationer. Företagets interna katastrofplan fungerade tillfredsställande. Rökgaserna skingrades utan att ställa till någon skada.

## Inblandade ämnen och mängder

	CAS Nr.	Mängd
copolymer (acrylonitril + vinylacetat)	24980-62-9	ca 3 ton
acrylonitril	107-13-1	startmaterial
vinyl acetat	108-05-04	startmaterial

## Skador:

Människor:	Inga personskador.
Materiella:	Anläggningen förstördes av branden.
Miljö/ekologi:	Inga effekter rapporterade.
Infrastruktur:	Allmänheten uppmanades att stanna inomhus bakom stängda fönster och dörrar, från kl 11.30 till kl 18.

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

## Report Profile

### Identification of Report:

country: FA ident key: 1800\_313\_01

reported under Seveso II directive as other event (non-Seveso) reports: SHORT+FULL

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

start: 15/03/1997 start: 11:10:00

finish: 15/03/1997 finish: 15:30:00

### Establishment:

name:

address:

industry: 2003 plastics and rubber manufacture

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

art. 7 (MAPP): No

art. 9 (safety report): Yes

### 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:** 1800\_313\_01**Accident Types:****release:** Yes **explosion:** No**water contamination:** No **other:** No**fire:** Yes**description:**

fire of a polymer during the drying phase with the generation of a cloud of substances deriving from the combustion of the polymer

**Substance(s) Directly Involved:****toxic:** Yes **explosive:** No**ecotoxic:** No **other:** No**flammable:** Yes**description:**

copolymer composed by acrylonitrile and vinyl acetate (acrylic polymer) CAS No. 24980-62-9

acrylonitrile CAS No. 107-13-1

vinyl acetate CAS No. 108-05-04

**Immediate Sources of Accident:****storage:** No **transfer:** No**process:** Yes **other:** No**description:**

drying of the polymer after the polymerisation reaction

**Suspected Causes:****plant or equipment:** Yes **environmental:** No**human:** No **other:** No**description:**

probable overheating of the polymer with ignition of the fire due to self-heating or due to an external source

(like sparks, etc.)

## Immediate Effects:

**material loss:** Yes

**human deaths:** No

**human injuries:** No **community disruption:** Yes

**other:** No

**ecological harm:** No

**national heritage loss:** No

### **description:**

significant economic loss due to the complete destruction of the drying plant and to loss of production.

Community disruption due to the instructions given by the authorities recommending to stay inside of buildings for some hours.

## Emergency Measures taken:

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

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

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

**evacuation:** No

### **description:**

The fire fighting service of the adjacent Enichem installation, which is a service in common with the Montefibre installation, was immediately alerted. Successive call of the national fire fighting service in different nearby cities. On-sit... see Appendix Short Report / description of emergency measures taken

## Immediate Lessons Learned:

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

**mitigation:** No

### **description:**

The company has to review the drying process in order to avoid the recurrence of such an accident. No further investigations.

# A Occurrence Full Report

**country:** FA **ident key:** 1800\_313\_01

## 1 Type of Accident

**remarks:** fire of an acrylic polymer during the drying phase in a belt dryer, downstream from a polymerisation plant, involving the whole drying plant and the release of a cloud composed of polymer combustion products, which moved towards neighbourin... see Appendix Full Report A / type of accident

## 2 Dangerous Substances

**remarks:** Acrylonitrile and vinyl acetate were possibly present only in very low amounts being included in the polymer as residues of starting materials in the polymerisation process. Apart from these traces, the substance which took fire is the acry... see Appendix Full Report A / dangerous substances

## 3 Source of Accident

**illustration:** none

**remarks:** The accident originated (started) in the copolymer belt dryer, divided in several sections, in each of which small quantities of water (residual from preceding processing phases of the polymer) are eliminated gradually with a hot air stream... see Appendix Full Report A / source of accident - remarks

#### 4 Meteorological Conditions

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

Yes No No No No

**wind speed (m/s):** 3

**direction (from):** SE

**stability (Pasquill):** variable - C - D - E

**ambient temperature (°C):** 16

**remarks:** The wind speed, wind direction and atmospheric stability was measured at 40 metres (40 m) above ground... see Appendix Full Report A / meteorological conditions

#### 5 Causes of Major Occurrence

**main causes**

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

5105 operation: instrument/control/monitoring-device failure

5109 operation: electrostatic accumulation

- not applicable -

- not applicable -

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

5313 organization: maintenance/repair (none, inadequate, inappropriate)

- not applicable -

- not applicable -

- not applicable -

**remarks:** The most likely causes which could be identified so far are:... see Appendix Full Report A

/ causes of major occurrence

#### 6 Discussion about the Occurrence

- not applicable -

**Type of Accident** country: FA ident key: 1800\_313\_01

**event:**

**major occurrence** 1401 other: combustion products into air

**initiating event** 1201 fire: conflagration (a general engulfment fire)

**associated event** - not applicable -

#### Dangerous substances

country: FA ident key: 1800\_313\_01

**a) total establishment inventory**

**CAS number: identity:**

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): 0

use of substance as:

**b) substance belongs to relevant inventory directly involved:** No

actual quantity: 0 potential quantity: 0

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

actual quantity: 0 indir\_pot\_quant: 0

**a) total establishment inventory**

CAS number: 108-05-4 identity: vinyl acetate

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): -1

use of substance as: starting material

**b) substance belongs to relevant inventory directly involved:** No

actual quantity: 0 potential quantity: 0

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

actual quantity: 0 indir\_pot\_quant: 0

**a) total establishment inventory**

CAS number: 107-13-1 identity:

name from Seveso I Directive: Acrylonitrile

name from Seveso II Directive: - not applicable -

category from Seveso II: toxic

other hazards (1): highly flammable liquids R17, R10

other hazards (2): - not applicable -

maximum quantity (tonnes): -1

use of substance as: starting material

**b) substance belongs to relevant inventory directly involved:** No

actual quantity: 0 potential quantity: 0

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

actual quantity: 0 indir\_pot\_quant: 0

## a) total establishment inventory

CAS number: 24980-62-9 identity: acrylonitrile vinyl-acetate copolymer

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): 450

use of substance as: normal finished product

b) substance belongs to relevant inventory directly involved: Yes

actual quantity: 3 potential quantity: 7

c) substance belongs to relevant inventory indirectly involved: No

actual quantity: 0 indir\_pot\_quant: 0

Source of Accident - Situation country: FA ident key: 1800\_313\_01

### situation

#### industry

initiating event 2003 plastics and rubber manufacture

associated event 2003 plastics and rubber manufacture

#### activity/unit

major occurrence 3104 process: physical operations (mixing, melting crystallizing, etc.)

initiating event 3104 process: physical operations (mixing, melting crystallizing, etc.)

associated event - not applicable -

#### component

major occurrence 4007 machinery/equipment (pump, filter, column separator, mixer, etc.)

initiating event 4007 machinery/equipment (pump, filter, column separator, mixer, etc.)

associated event - not applicable -

## B Consequences Full Report

country: FA ident key: 1800\_313\_01

### 1 Area concerned

#### affected

extent of effects installation: Yes

establishment: Yes

off-site; local: Yes

off-site; regional: No

off-site; transboundary: No

illustration of effects the fire destroyed completely the drying plant. Nearby plants

(installations, eq... see Appendix Full Report B / area concerned -

illustration of effects

remarks - not applicable -

## 2 People

establishment popul. emergency personnel off-site population

total at risk 150 10 10000

immediate fatalities 0 0 0

subsequent fatalities 0 0 0

hospitalizing injuries 0 0 0

other serious injuries 0 0 0

health monitoring 0 0 0

remarks The establishment works 24 hours a day, but being a Saturday the personnel was r... see Appendix

Full Report B / people

## 3 Ecological Harm

pollution/contamination/damage of:

- residential area (covered by toxic cloud) Suspected

- common wild flora/fauna (death or elimination) not applicable

- rare or protected flora/fauna (death or elimination) not applicable

- water catchment areas and supplies for consumption or recreation not applicable

- land (with known potential for long term ecological harm or not applicable

preventing human access or activities)

- marine or fresh water habitat not applicable

- areas of high conservation value or given special protection not applicable

remarks There been no ecological damages reported, considering also the low concentratio... see Appendix

Full Report B / ecological harm

## 4 National Heritage Loss

effects on:

- historical sites None - historic monuments None

- historic buildings None - art treasures None

remarks - not applicable -

## 5 Material Loss

establishment losses off site losses

costs (direct costs to operator) (social costs)

in ECU LIT ECU LIT

material losses 0 -1 0 0

response, clean up, restoration 0 -1 0 0

remarks The company estimates production losses in:... see Appendix Full Report B / material loss

## 6 Disruption of Community Life

establishment/plant evacuated disabled/unoccupiable destroyed

- **nearby residences/hotels** Yes No No

- **nearby factories/offices/small shops** Yes No No

- **schools, hospitals, institutions** Yes No No

- **other places of public assembly** Yes 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** No Yes No

- **media interest** No Yes No

- **political interest** Yes No No

**remarks** Due to the accident and the fact that the cloud of smoke was expanding towards t... see Appendix

## **7 Discussion of Consequences**

### **Ecological Components involved**

**country:** FA **ident key:** 1800\_313\_01

**type:** 6102 inland: urban development

**threatened:** Suspected **affected:** No

## **C Response Full Report**

**country:** FA **ident key:** 1800\_313\_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

From the analysis of the safet... see Appendix Full Report C / lesson learned - prevent

measures to mitigate consequences:

see previous point

useful references:

The models employed are those ... see Appendix Full Report C / lesson learned - references

### **5 Discussion about Response**

- not applicable -

## **Appendices for the FA / 1800\_313\_01 report**

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

The fire fighting service of the adjacent Enichem installation, which is a service in common with the Montefibre installation, was immediately alerted. Successive call of the

national fire fighting service in different nearby cities. On-site the measures foreseen by the onsite emergency plan were successfully adopted. Message sent by the prefecture and by the civil protection institution recommending the population to remain closed inside and announcement of the end of the alarm at 18:00 of the same day.

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

fire of an acrylic polymer during the drying phase in a belt dryer, downstream from a polymerisation plant, involving the whole drying plant and the release of a cloud composed of polymer combustion products, which moved towards neighbouring installations and establishments in the direction of the residential area of Marghera situated at a distance of about four kilometres (4 km) from the installation (establishment)

### **Appendix Full Report A / dangerous substances:**

Acrylonitrile and vinyl acetate were possibly present only in very low amounts being included in the polymer as residues of starting materials in the polymerisation process. Apart from these traces, the substance which took fire is the acrylonitrile vinyl-acetate copolymer.

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

The accident originated (started) in the copolymer belt dryer, divided in several sections, in each of which small quantities of water (residual from preceding processing phases of the polymer) are eliminated gradually with a hot air stream.

### **Appendix Full Report A / meteorological conditions:**

The wind speed, wind direction and atmospheric stability was measured at 40 metres (40 m) above ground

Class C: 11 - 12 hours

Class D: 12 - 13 hours

Class C: 13 - 15 hours

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

The most likely causes which could be identified so far are:

- 1) abnormal friction between the belt and the dryer's body generating sparks
- 2) accumulation of polymer dust on the heated batteries with consequent overheating of the same, due to a failure of the belt or of the hot air ventilator or due to an insufficient removal of processing residues.

### **Appendix Full Report B / area concerned - illustration of effects:**

the fire destroyed completely the drying plant. Nearby plants (installations, equipment) were not affected by the fire, in particular neither the polymerisation plant (installation) nor the monomer and catalyst storage facilities were affected by the fire. Whereas the combustion products ( smoke cloud) have affected, in wind direction, an area covering some km<sup>2</sup> (square kilometre) starting from the ignition point. Basing on the results of the measurements made with existing stations owned by the "Porto Marghera Industrial Area Authority" (Ente Zona Industriale Porto Marghera), taking into consideration the thermal profile measured at a station some 1,5 km (kilometres) N (north) from the establishment with temperature sensors at 10, 70, 140 m (metres) above ground, it appears that a good dilution of the combustion products in the atmosphere and low levels of down-fall on the ground can be assumed; this appears to be confirmed in the low concentration increases of SO<sub>2</sub>, dust, NO, NO<sub>x</sub>, NO<sub>2</sub> measured by the stations nearby the residential area of Marghera and, indirectly by the fact that no cases of intoxication due to the accident were reported.

### **Appendix Full Report B / people:**

The establishment works 24 hours a day, but being a Saturday the personnel was reduced (weekend, less people at risk onsite), normally there are about 300 persons present onsite, no injuries (no people burned), no persons affected by the accident were reported.

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

There been no ecological damages reported, considering also the low concentration measured at ground level.

### **Appendix Full Report B / material loss:**

The company estimates production losses in:

- 38 billion LIT (20000000 ECU) during the first month
- 162 billion LIT (85000000 ECU) during the 9 month foreseen for resume completely the production.

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

Due to the accident and the fact that the cloud of smoke was expanding towards the residential areas of Marghera, the civil protection institutions sent in accordance with the prefecture a message to the population asking the citizens to stay inside the buildings. The message was sent at about 11:30 and the alarm was finished at 18:00.

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

From the analysis of the safety report presented to the competent authorities in compliance to the Italian legislation implementing the Seveso Directive it results that the accident which occurred was considered in the safety report as the most probable with respect to the specific equipment (plant). In relation to this a thorough analysis of possible fire causes had been realised, considering also historical data on fires in similar installations. To avoid the occurrence of fires, adequate structural and operational measures had also been foreseen. Nevertheless the accident (fire) occurred, therefore it has to be assumed that it occurred because of the measures foreseen have been implemented not at all or only partially (inadequate implementation, causes identified but no adequate response). It appears that the company had planned to adopt further measures in addition to those indicated in the safety report in order to reduce the fire risk, measures which could not be implemented in time, due to the fire.

### **Appendix Full Report C / lesson learned - references:**

The models employed are those commonly employed for atmospheric releases forming clouds containing combustion products of solid substances (standard models).