

# Explosion och brand på en fabrik för produktion av farmaceutika.

850505 MARS 1985\_06

Vid tillsättning av pulver till en satsvis reaktor som innehöll aceton inträffade en dammexplosion. Branden skadade en kontrollpanel och en del elektriska kablar. Branden släcktes snabbt av det automatiska sprinklersystemet. Tillsatsen skedde normalt inte i pulverform.

## Inblandade ämnen och mängder

	CAS Nr.	Mängd
aceton	67-41-1	100 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: 1985\_006\_01

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

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

start: 1985-05-05 start:

finish: finish:

### Establishment:

name:

address:

industry: 2004 pesticides, pharmaceuticals, other fine chemicals

Pharmaceutical (Process Plant)

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: 1985\_006\_01

### **Accident Types:**

release: No explosion: Yes

water contamination: No other: No

fire: Yes

#### **description:**

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

### **Substance(s) Directly Involved:**

toxic: No explosive: Yes

ecotoxic: No other: No

flammable: Yes

#### **description:**

No data are available about the type and the amount of the powder involved if the accident.... see Appendix

Short Report / description of substances involved

### **Immediate Sources of Accident:**

storage: No transfer: No

process: Yes other: No

#### **description:**

The accident occurred in a pharmaceutical industry during the addition of a powdered pharmaceutical product

through a stainless steel charge chute into a chemical reactor containing acetone at 40°C. The procedure was

not a normal one because... 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:... see Appendix Short Report / description of immediate effects

### **Emergency Measures taken:**

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

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

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

**evacuation:** No

**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:** 1985\_006\_01

### **1 Type of Accident**

**remarks:** A small explosion (code 1305) with a subsequent fire (code 1202) occurred during the addition of a powdered pharmaceutical product through a stainless steel charge chute into a chemical reactor containing acetone.

### **2 Dangerous Substances**

**remarks:** No data are available about the type and the amount of the pharmaceutical powder involved in the accident. The total establishment and the potential directly involved inventories of acetone refer to the amount involved in the accident.

### **3 Source of Accident**

**illustration:** - not applicable -

**remarks:** The accident occurred in a pharmaceutical industry (code 2004), during the addition (code 3101) of a powdered pharmaceutical product through a stainless steel charge chute into a chemical reactor containing acetone at 40°C (code 4001). The ... 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** 5109 operation: electrostatic accumulation

- not applicable -

- not applicable -

- not applicable -

- not applicable -

**human / organizational** 5302 organization: management attitude problem

5303 organization: organized procedures (none, inadequate, inappropriate, unclear)

- not applicable -

- not applicable -

- not applicable -

**remarks:** The addition of a powdered product into a chemical reactor containing acetone instead of the usual wet cake was not a normal procedure. The insufficient operational procedures (codes 5302 and 5303) for this situation allowed to carry out it... see Appendix Full

Report A / causes of major occurrence

## 6 Discussion about the Occurrence

- not applicable -

**Type of Accident** country: FA ident key: 1985\_006\_01

**event:**

**major occurrence** 1305 explosion: dust explosion

**initiating event** - not applicable -

**associated event** - not applicable -

**event:**

**major occurrence** 1202 fire: pool fire (burning pool of liquid, contained or uncontained)

**initiating event** 1305 explosion: dust explosion

**associated event** - not applicable -

## Dangerous substances

country: FA ident key: 1985\_006\_01

### a) total establishment inventory

**CAS number: identity:** Pharmaceutical Powder

**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:** NORMAL FINISHED PRODUCT

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

**actual quantity:** -1 **potential quantity:** -1

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

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

**a) total establishment inventory**

**CAS number:** 67-64-1 **identity:** Acetone

**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):** 0,1

**use of substance as:** STARTING MATERIAL

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

**actual quantity:** 0,1 **potential quantity:** 0,1

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

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

**Source of Accident - Situation** country: FA **ident key:** 1985\_006\_01

**situation**

**industry**

**initiating event** 2004 pesticides, pharmaceuticals, other fine chemicals

**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** 4001 reaction vessel; non-pressurised

**initiating event** 4001 reaction vessel; non-pressurised

**associated event** - not applicable -

## **B Consequences Full Report**

country: FA ident key: 1985\_006\_01

## 1 Area concerned

**affected**

**extent of effects installation:** Yes

**establishment:** No

**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 i... see Appendix

Full Report B / area concerned - remarks

## 2 People

**establishment popul. emergency personnel off-site population**

**total at risk** 1

**immediate fatalities**

**subsequent fatalities**

**hospitalizing injuries**

**other serious injuries**

**health monitoring**

**remarks** No operators were in the vicinity of the charge chute when the explosion occurre... 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) 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 Irish Pounds ECU Irish Pounds**

**material losses 1000**

**response, clean up, restoration**

**remarks** The cost of the fire damages to the nearby control panel, to the electrical cabl... see Appendix

Full Report B / material loss

## **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 i... see Appendix

## **7 Discussion of Consequences**

# **C Response Full Report**

**country:** FA **ident key:** 1985\_006\_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 compan... 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 / 1985\_006\_01 report

## Appendix Short Report / description of accident types:

### SAFETY SYSTEMS OR OPERATORS INTERVENTION:

The automatic sprinkler system intervened.

### ACCIDENT CASE HISTORY DESCRIPTION:

A small explosion with a subsequent fire occurred during the addition of a powdered pharmaceutical product through a stainless steel charge chute into a chemical reactor containing acetone at 40°C. The fire damaged a nearby control panel and electric cable insulation. As no operators were in the vicinity of the charge chute when the explosion occurred no one was injured. The charging operator had just started operating the control valve on the acetone addition line (3 metres away) when the explosion occurred.

## Appendix Short Report / description of substances involved:

No data are available about the type and the amount of the powder involved if the accident.

- Acetone (C.A.S. CODE:67-41-1, E.E.C. CODE: 606-001-02-8): amount involved = 100 kg.

## Appendix Short Report / description of immediate sources:

The accident occurred in a pharmaceutical industry during the addition of a powdered pharmaceutical product through a stainless steel charge chute into a chemical reactor containing acetone at 40°C. The procedure was not a normal one because a dry powder was added to the flammable solvent instead of the usual wet cake. The powder was a finished product that had not passed quality control purity tests and had to be recrystallized.

## Appendix Short Report / description of suspected causes:

### CAUSES:

Investigations showed that the procedure was not a normal one because dry powder was added to the flammable solvent instead of the usual wet cake. The powder was a finished product that did not pass quality control purity test and had to be recrystallized. No nitrogen inerting was used and, as some acetone vapours would have been emitted from the charging chute, the combustion was made possible. The insufficient operational procedures for this situation allowed to carry out it without considering the risk of a dust explosion. The most likely source of ignition was an electrostatic discharge resulting either from splash filling of the acetone or from the chute charging of the finely divided pharmaceutical powder.

## Appendix Short Report / description of immediate effects:

### MATERIAL LOSS:

The cost of the fire damages (to a nearby control panel, to the electric cable insulation and to the paint) has been evaluated in about 1,000 Irish Pounds (about 0.0013 MECU).

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

### INTERNAL TO THE ESTABLISHMENT:

The fire was quickly extinguished by the intervention of the automatic sprinkler system.

### EXTERNAL TO THE ESTABLISHMENT:

No off-site emergency measures were required.

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

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

After the accident, the company was requested to carry out:

- 1- an electrostatic survey of the whole plant in the process area;
- 2- a safety review on all non-standard operations before re-start of the plant.

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

The accident occurred in a pharmaceutical industry (code 2004), during the addition (code 3101) of a powdered pharmaceutical product through a stainless steel charge chute into a chemical reactor containing acetone at 40°C (code 4001). The procedure was not a normal one because a dry powder was added to the flammable solvent instead of the usual wet cake. The powder was a finished product that had not passed quality control purity tests and had to be recrystallized.

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

The addition of a powdered product into a chemical reactor containing acetone instead of the usual wet cake was not a normal procedure. The insufficient operational procedures (codes 5302 and 5303) for this situation allowed to carry out it without considering the risk of a dust explosion. The most likely source of ignition was an electrostatic discharge (code 5109) resulting either from splash filling of the acetone or from the chute charging of the finely divided pharmaceutical powder.

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

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

## Appendix Full Report B / people:

No operators were in the vicinity of the charge chute when the explosion occurred, so no one was injured.

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

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

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

The cost of the fire damages to the nearby control panel, to the electrical cable insulation and to the paint has been negligible (about 1,000 Irish Pounds).

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

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

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

After the accident, the company was requested to carry out:

- 1- an electrostatic survey of the whole plant in the process area;
- 2- a safety review on all non-standard operations before re-start of the plant.