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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME  
(NICNAS)**

**PUBLIC REPORT**

**Polymer in Dispex® HIDE CX 4540**

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act) and Regulations. This legislation is an Act of the Commonwealth of Australia. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) is administered by the Department of Health, and conducts the risk assessment for public health and occupational health and safety. The assessment of environmental risk is conducted by the Department of the Environment and Energy.

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**Director  
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## SUMMARY

The following details will be published in the NICNAS *Chemical Gazette*:

ASSESSMENT REFERENCE	APPLICANT(S)	CHEMICAL OR TRADE NAME	HAZARDOUS CHEMICAL	INTRODUCTION VOLUME	USE
LTD/2061	BASF Australia LTD	Polymer in Dispex® HIDE CX 4540	ND*	< 100 tonnes per annum	A component of water based industrial and architectural coatings

\*ND = not determined

## CONCLUSIONS AND REGULATORY OBLIGATIONS

### **Hazard classification**

As no toxicity data were provided, the notified polymer cannot be classified according to the *Globally Harmonised System of Classification and Labelling of Chemicals* (GHS), as adopted for industrial chemicals in Australia.

### **Human health risk assessment**

Provided that the recommended controls are being adhered to, under the conditions of the occupational settings described, the notified polymer is not considered to pose an unreasonable risk to the health of workers.

When used in the proposed manner, the notified polymer is not considered to pose an unreasonable risk to public health.

### **Environmental risk assessment**

On the basis of the PEC/PNEC ratio and the reported use pattern, the notified polymer is not considered to pose an unreasonable risk to the environment.

### **Recommendations**

#### CONTROL MEASURES

#### Occupational Health and Safety

- A person conducting a business or undertaking at a workplace should implement the following engineering controls to minimise occupational exposure to the notified polymer during reformulation:
  - Local exhaust ventilation
- A person conducting a business or undertaking at a workplace should implement the following engineering controls to minimise occupational exposure to the notified polymer during spray application:
  - conducting of spray operations in well-ventilated areas or spray booths
- A person conducting a business or undertaking at a workplace should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer for reformulation and end-use:
  - Avoid skin and eye contact
  - Avoid inhalation of aerosols
- A person conducting a business or undertaking at a workplace should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer during reformulation and end-use:
  - coveralls, impervious gloves, eye protection
  - organic vapour respirators during reformulation and spray application

Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

- Spray applications should be carried out in accordance with the Safe Work Australia Code of Practice for *Spray Painting and Powder Coating* (SWA, 2015) or relevant State or Territory Code of Practice.
- A copy of the SDS should be easily accessible to employees.
  - If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the *Globally Harmonised System of Classification and Labelling of Chemicals* (GHS) as adopted for industrial chemicals in Australia, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation should be in operation.

#### Disposal

- Where reuse or recycling are not appropriate, dispose of the notified polymer in an environmentally sound manner in accordance with relevant Commonwealth, state, territory and local government legislation.

#### Emergency procedures

- Spills or accidental release of the notified polymer should be handled by physical containment, collection and subsequent safe disposal.

### Regulatory Obligations

#### *Secondary Notification*

This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the chemical under secondary notification provisions based on changes in certain circumstances. Under Section 64 of the *Industrial Chemicals (Notification and Assessment) Act (1989)* the notifier, as well as any other importer or manufacturer of the notified chemical, have post-assessment regulatory obligations to notify NICNAS when any of these circumstances change. These obligations apply even when the notified polymer is listed on the Australian Inventory of Chemical Substances (AICS).

Therefore, the Director of NICNAS must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under Section 64(1) of the Act; if
  - The concentration of the notified polymer in the end products for public use is greater than 0.25%or
- (2) Under Section 64(2) of the Act; if
  - the function or use of the polymer has changed from component of water based industrial and architectural coatings, or is likely to change significantly;
  - the amount of polymer being introduced has increased, or is likely to increase, significantly;
  - the polymer has begun to be manufactured in Australia;
  - additional information has become available to the person as to an adverse effect of the polymer on occupational health and safety, public health, or the environment.

The Director will then decide whether a reassessment (i.e. a secondary notification and assessment) is required.

#### *Safety Data Sheet*

The SDS of the product containing the notified chemical provided by the notifier was reviewed by NICNAS. The accuracy of the information on the SDS remains the responsibility of the applicant.

## **ASSESSMENT DETAILS**

### **1. APPLICANT AND NOTIFICATION DETAILS**

**APPLICANT(S)**

BASF Australia Ltd (ABN: 62 008 437 867)  
Level 12, 28 Freshwater Place  
SOUTHBANK VIC 3006

**NOTIFICATION CATEGORY**

Limited: Synthetic polymer with  $M_n \geq 1,000$  g/mol

**EXEMPT INFORMATION (SECTION 75 OF THE ACT)**

Data items and details claimed exempt from publication: chemical name, other names, CAS number, molecular and structural formulae, molecular weight, analytical data, degree of purity, polymer constituents, residual monomers, impurities, additives/adjuvants, use details, import volume, and identity of manufacturer.

**VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT)**

Variation to the schedule of data requirements is claimed as follows: Water Solubility, Particle Size, Flash Point, Flammability Limits, Oxidising Properties, Reactivity and all Toxicity Endpoints.

**PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S)**

None

**NOTIFICATION IN OTHER COUNTRIES**

China (2017)

### **2. IDENTITY OF CHEMICAL**

**MARKETING NAME(S)**

Dispex® HIDE CX 4540 (product containing the notified polymer)

**MOLECULAR WEIGHT**

Number Average Molecular Weight ( $M_n$ ) is  $> 1,000$  g/mol

**ANALYTICAL DATA**

Reference IR and GPC spectra were provided.

### **3. COMPOSITION**

**DEGREE OF PURITY**

$> 95\%$

**LOSS OF MONOMERS, OTHER REACTANTS, ADDITIVES, IMPURITIES**

The notified polymer is expected to be stable under the conditions of use. No losses by volatilisation, exudation or leaching are expected from the notified polymer.

**DEGRADATION PRODUCTS**

No degradation, decomposition or depolymerisation of the notified polymer is expected to occur under normal conditions of use.

### **4. PHYSICAL AND CHEMICAL PROPERTIES**

APPEARANCE AT 20 °C AND 101.3 kPa: Light brown solid

Property	Value	Data Source/Justification
Melting Point/Freezing Point	$> 190$ °C	Measured (No melting was observed between -30 °C and 100 °C. The polymer started to swell at 190 °C)
Boiling Point	Not determined	Measured (The test item does not melt up to a

Relative Density	1.333	temperature of 100 °C at which decomposition starts).
Vapour Pressure	Not determined	Measured
		Measured (The measurements showed a continuous decrease of the calculated vapour pressure values. This indicates a thermally caused change of the test item).
Water Solubility	696.4 – 793.9 g/L at 20°C	Measured
Hydrolysis as a Function of pH	Not detected at pH 4, 7 or 9	Measured
Partition Coefficient (n-octanol/water)	log Pow < -4.8 at 20 °C	Calculated from single solubilities in n-octanol and water
Adsorption/Desorption	Not determined	Expected to partition to surfaces from water in the environment based on its surface activity
Dissociation Constant	pKa = 5.1-10.1	Measured
Flash Point	> 100 °C	SDS
Flammability	Not flammable	Measured (The test was considered to be negative as localised burning or glowing with practically no spreading was observed).
Autoignition Temperature	Not self-igniting	Measured (No self-heating up to the melting point was noted).
Explosive Properties	Not determined	Contains no functional groups that would imply explosive properties.
Oxidising Properties	Not determined	Contains no functional groups that would imply oxidising properties.

## DISCUSSION OF PROPERTIES

For full details of tests on physical and chemical properties, refer to Appendix A.

*Reactivity*

The notified polymer is expected to be stable under normal conditions of use.

**Physical hazard classification**

Based on the submitted physico-chemical data depicted in the above table, the notified polymer is not recommended for physical hazard classification according to the *Globally Harmonised System of Classification and Labelling of Chemicals* (GHS), as adopted for industrial chemicals in Australia.

**5. INTRODUCTION AND USE INFORMATION**

## MODE OF INTRODUCTION OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

The notified polymer will not be manufactured in Australia. The notified polymer will be imported into Australia as a component of the formulation Dispex® HIDE CX 4540.

## MAXIMUM INTRODUCTION VOLUME OF NOTIFIED CHEMICAL (100%) OVER NEXT 5 YEARS

Year	1	2	3	4	5
Tonnes	< 100	< 100	< 100	< 100	< 100

## PORT OF ENTRY

Throughout Australia

## TRANSPORTATION AND PACKAGING

The imported product containing the notified polymer (at < 50% concentration) will be packaged in 120 kg open head plastic drums or 1,120 kg intermediate bulk containers (IBCs). The reformulated coatings (with ≤ 0.25% notified polymer) will be packaged in 1L, 4L, 10L lined steel cans and 210 kg lined steel drums. Transportation will be predominantly by road.

## USE

The notified polymer will be used as a pigment dispersant in water based industrial and architectural coatings at a concentration of ≤ 0.25%.

## OPERATION DESCRIPTION

At the reformulation facilities, the imported product containing the notified polymer will be transferred by gravity or through a low pressure pump into a mixing vessel containing a mixture of solvents, water and resins. Once the blending of the product is complete, samples will be taken for quality control testing and the final paint or pigment slurry will be filled into lined steel containers also by gravity feed or low pressure pumps. Ventilation and personal protective clothing will be used during the reformulation processes.

The reformulated coating products containing the notified polymer (at  $\leq 0.25\%$  concentration) will be applied in industrial and architectural coatings application facilities and facilities producing large fibreglass mouldings such as boats and pools application is primarily by spray in engineered facilities with ventilation and using personal protective equipment including air fed respirators. Limited application by brush and roller is expected.

## 6. HUMAN HEALTH IMPLICATIONS

### 6.1. Exposure Assessment

#### 6.1.1. Occupational Exposure

## CATEGORY OF WORKERS

<i>Category of Worker</i>	<i>Exposure Duration (hours/day)</i>	<i>Exposure Frequency (days/year)</i>
Transport and storage	1	4
Warehouse	1	4
Process operator	2.5	40
Quality control	0.5	40
Packaging	2	40
End use	1	60

## EXPOSURE DETAILS

*Transport and Storage*

Transport and storage workers may come into contact with the notified polymer at  $< 50\%$  concentration, only in the unlikely event of an accidental breach of the product packaging during unloading and transport to the customer sites or through spillage when the products are transferred from IBCs or drums to on-site tanks.

*Reformulation*

Dermal and ocular exposure to the notified polymer at  $< 50\%$  concentration may occur when adding and transferring this product by gravity or using low pressure pumps, charging the blending vessels and when connecting or disconnecting transfer hoses, cleaning or maintaining equipment, testing for quality control and packaging. Inhalation exposure to the notified polymer may also occur if aerosols are formed. Exposure will be minimised through the use of local exhaust ventilation and personal protective equipment (PPE) such as eye protection, impervious gloves, coveralls and respirators as stated by the notifier.

*End use*

Dermal, ocular and inhalation exposure to the notified polymer at  $\leq 0.25\%$  concentration may occur during application of the finished paints and coatings. Paints or coatings application will be primarily by spray, but brush and roller are also used in limited applications. As stated by the notifier, the potential for exposure will be minimised through the use of PPE (eye protection, impervious gloves, coveralls) by workers, including the use of respiratory protection during spray application. Inhalation exposure will be further reduced through the use of exhaust ventilation and spray booths, where possible. After application and once dried, the notified polymer will be cured into an inert solid matrix and will not be available for exposure.

#### 6.1.2. Public Exposure

Finished coatings containing the notified polymer at  $\leq 0.25\%$  concentration are intended for use in industrial settings only. Very limited sales of paints containing the notified polymer at  $\leq 0.25\%$  concentration to the public are anticipated, due to the high levels of equipment and expertise required to apply these coatings professionally. The public may come into contact with the dried finished products (paints or coatings) containing the notified polymer which have been applied. After application and once dried, the notified polymer will be cured into an inert solid matrix and will not be available for exposure.

## 6.2. Human Health Effects Assessment

No toxicity data on the notified polymer were submitted.

No data on toxicokinetics for the notified polymer was provided. For dermal absorption, molecular weights below 100 g/mol are favourable for absorption and molecular weights above 500 g/mol do not favour absorption (ECHA, 2017). Dermal uptake is likely to be low to moderate if the water solubility is between 1-100 mg/L and moderate to high if the water solubility is between 100-10,000 mg/L (ECHA, 2017). The notified polymer has a high molecular weight (> 1000 g/mol) favouring low dermal absorption. However, due to the high water solubility of the polymer (< 79.39 g/L), absorption possibility across biological membranes cannot be ruled out.

### Health hazard classification

As no toxicity data were provided, the notified polymer cannot be classified according to the *Globally Harmonised System of Classification and Labelling of Chemicals* (GHS), as adopted for industrial chemicals in Australia.

## 6.3. Human Health Risk Characterisation

### 6.3.1. Occupational Health and Safety

There was no toxicity data provided on the notified polymer. The physical properties of the notified polymer suggest that it is unlikely to be a corrosive and dermal absorption is expected to be low although it cannot be completely ruled out due to the high water solubility of the polymer.

Workers may be exposed to the notified polymer at < 50% concentration during reformulation and at  $\leq 0.25\%$  concentration during application of paints and coatings containing it by brush, roller and spray. However, exposure is expected to be low given the proposed use of PPE by these workers including coveralls, impervious gloves, eye protection and organic vapour respirators, particularly during spray application, and the conducting of spray operations in well-ventilated areas or spray booths.

Provided that the recommended controls are being adhered to, under the conditions of the occupational settings described, the notified polymer is not considered to pose an unreasonable risk to the health of workers.

### 6.3.2. Public Health

Paints and coatings containing the notified polymer at  $\leq 0.25\%$  concentration will be mainly used in industrial settings only. However, less than 1% of the sales will be made available to the public. Members of the public may come into contact with surfaces coated with products containing the notified polymer. However, after the coatings are cured, the notified polymer will be bound into an inert matrix and will not be available for exposure. Therefore, when used in the proposed manner, the risk to public health is not considered to be unreasonable.

## 7. ENVIRONMENTAL IMPLICATIONS

### 7.1. Environmental Exposure & Fate Assessment

#### 7.1.1. Environmental Exposure

##### RELEASE OF CHEMICAL AT SITE

The notified polymer will not be manufactured in Australia. Therefore, there will be no release of the polymer from manufacture. Reformulation of the notified polymer will occur in Australia in a closed system where release to the environment will be negligible. Manufacturing equipment for the reformulated product is flushed with water and either recycled for reuse in the manufacturing facility or disposed of according to local environmental regulations.

Release of the polymer during importation, transport or distribution will only occur through accidental spills. Where an accidental spill occurs the notified polymer is expected to be contained and collected, with residues absorbed using suitable absorbent material. Materials collected from accidental spills are to be disposed of by a licensed waste disposal company.

##### RELEASE OF CHEMICAL FROM USE

Coating products containing the notified polymer are only to be available to industrial and architectural users with less than 1% of the product predicted to be obtained by the general public. The products containing the notified polymer are only expected to be used in facilities with engineering controls and applied via spray, roller



and brush. Any waste which is produced on the site is collected and disposed of according to local regulations and no waste is to be discharged into sewers or waterways. As such there is no significant expected environmental exposure expected from the application of products containing the notified polymer.

#### RELEASE OF CHEMICAL FROM DISPOSAL

The notified polymer is only to be used in protective coatings is expected to share the fate of the article to which it has been applied. The notified polymer is likely to be either thermally decomposed during metal reclamation processes or disposed of to landfill at the end of the useful life of the article to which it has been applied.

#### 7.1.2. Environmental Fate

Notified polymer is a dispersant for inorganic pigments in industrial coatings and as such will share the fate of the article it is applied to. Any accidental spills or excess waste will be disposed of in accordance with environmental regulations, including through licensed waste disposal contractors and incineration. Washed, empty containers are sent to trade waste for disposal; it is possible that nominal amounts of the notified polymer may be present, otherwise empty end-use containers are disposed of in landfill. Under the proposed use patterns, significant quantities of the notified polymer are not expected to reach wastewaters.

Once disposed of the notified polymer is expected to be poorly biodegradable. The notified polymer is not expected to bioaccumulate due to the high molecular weight and high water solubility.

No environmental fate data were submitted

#### 7.1.3. Predicted Environmental Concentration (PEC)

It is predicted by the notifier that 1% of the total annual import volume of notified polymer is obtained for use by the general public. As the worst case scenario, assuming 5% of the public use volume will be incorrectly disposed of to the sewers, drains, or ground from waste and washing of application equipment. This assumption estimates that 0.05% of the import volume of the notified polymer will be potentially released into the sewers. It is also assumed under the worst-case scenario that no removal of the notified polymer will occur during wastewater treatment processes. Based on these assumptions, the predicted environmental concentration (PEC) has been calculated as in the table below.

#### *Predicted Environmental Concentration (PEC) for the Aquatic Compartment*

Total Annual Import/Manufactured Volume	100,000	kg/year
Proportion expected to be released to sewer	0.05%	
Annual quantity of chemical released to sewer	50.000	kg/year
Days per year where release occurs	365	days/year
Daily chemical release:	0.14	kg/day
Water use	200.0	L/person/day
Population of Australia (Millions)	24.386	million
Removal within STP	0%	
Daily effluent production:	4,877	ML
Dilution Factor - River	1.0	
Dilution Factor - Ocean	10.0	
PEC - River:	0.028	µg/L
PEC - Ocean:	0.003	µg/L

#### 7.2. Environmental Effects Assessment

No ecotoxicological data were submitted for the notified polymer. Anionic polymers are generally of low toxicity to fish and daphnia, however they are known to be moderately toxic to algae. The mode of toxic action is over-chelation of nutrient elements needed by algae for growth. The highest toxicity is when the acid is on alternating carbons of the polymer backbone, leading to chelation of essential nutrients. All endpoints in the table below are derived from the SDS which is based on an unspecified analogue to the notified polymer.

<i>Endpoint</i>	<i>Result</i>	<i>Assessment Conclusion</i>
Fish Toxicity	EC50 > 100 mg/L	Analogue is not toxic to fish
Daphnia Toxicity	EC50 > 100 mg/L	Analogue is not toxic to invertebrates
Algal Toxicity	EC50 > 100 mg/L	Analogue is not toxic to algae

**7.2.1. Predicted No-Effect Concentration**

The predicted no-effect concentration was calculated based on an unspecified analogue data and an assessment factor of 1000. A conservative assessment factor 1000 is applied given the calculation is based on the analogue data.

<b><i>Predicted No-Effect Concentration (PNEC) for the Aquatic Compartment</i></b>			
EC50	100.00	mg/L	
Assessment Factor	1000.00		
PNEC:	100.00	µg/L	

**7.3. Environmental Risk Assessment**

<b><i>Risk Assessment</i></b>	<b><i>PEC µg/L</i></b>	<b><i>PNEC µg/L</i></b>	<b><i>Q</i></b>
Q - River:	0.028	100	< 0.01
Q - Ocean:	0.003	100	< 0.001

The risk quotient ( $Q=PEC/PNEC$ ) has been calculated based on the assumption of complete release into the waterways. The calculated Q value indicated that it is highly unlikely that the notified polymer will reach ecotoxicologically significant concentrations based on the proposed annual importation volume and use patterns. The notified polymer is not considered to pose an unreasonable risk to the environment.

## APPENDIX A: PHYSICAL AND CHEMICAL PROPERTIES

### Melting Point/Freezing Point > 190 °C

Method	OECD TG 102 Melting Point/Melting Range EC Council Regulation No 440/2008 A.1 Melting/Freezing Temperature
Remarks	The test item had no melting point. A decomposition of the test item started at about 100 °C in the test and in an additional test in a capillary tube showed no detectable change of the test item up to about 190 °C, where a strong swelling started.
Test Facility	BASF (2017a)

### Boiling Point Not determined

Method	No measurement was conducted.
Remarks	The test item starts decomposing at 100 °C.
Test Facility	BASF (2017a)

### Relative Density 1.333

Method	OECD TG 109 Density of Liquids and Solids
Remarks	The density was measured by the gas pycnometer method according to DIN EN ISO 1183-3.
Test Facility	BASF (2017a)

### Vapour Pressure Not determined

Method	OECD TG 104 Vapour Pressure (effusion method - weight loss)
Remarks	The vapour pressure could not be determined as the measurements showed a continuous decrease of the calculated vapour pressure values due to a thermally caused change of the test item.
Test Facility	BASF (2017a)

### Water Solubility $\geq 696.4 - 793.9$ g/L at 20°C

Method	EM/00408/01 from Competence Center Analytics, BASF SE (Chapter 4: visual method) In house method
Remarks	Test item and water were mixed at different ratios to cover a range of miscibility. Samples were mixed on a roller overnight at 23°C and later conditioned overnight at 20°C
Test Facility	Competence Center Analytics, BASF SE (2017f)

### Hydrolysis as a Function of pH

Method	OECD TG 111 Hydrolysis as a Function of pH
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<i>pH</i>	<i>T (°C)</i>	<i>t</i> <sub>½</sub> <hours or days>
4	50.0 ± 0.5°C	N/A
7	50.0 ± 0.5°C	N/A
9	50.0 ± 0.5°C	N/A

Remarks	No hydrolysis was detected after 5 days at pH 4, 7 or 9.
Test Facility	Competence Center Analytics, BASF SE (2017c)

### Partition Coefficient (n-octanol/water) log Pow = < -4.8 at 20 °C

Method	Calculated from single solubilities in n-octanol and water.
Remarks	Log Pow calculation is based on the n-octanol solubility of the test item < 11.75 mg/L at 23 °C.
Test Facility	Competence Center Analytics, BASF SE (2017e)

**Adsorption/Desorption**

Not determined

Method	OECD TG 121: Estimation of the Adsorption Coefficient (K <sub>oc</sub> ) on Soil and on Sewage Sludge using High Performance Liquid Chromatography (HPLC)
Remarks	Notified chemical is not suitable for this test method as it is a mixture of homologues. However it is expected to partition to surfaces from water in the environment based on its surface activity
Test Facility	Competence Center Analytics, BASF SE (2017d)

**Dissociation Constant**pK<sub>a</sub> = 5.1-10.1

Method	Potentiometric titration with pH evaluation of the half-equivalence point. (in house method)
Remarks	Notified polymer is likely to dissociate in water.
Test Facility	Competence Center Analytics, BASF SE (2017a)

**Flammability**

Not flammable

Method	Test performed in accordance with the test method described in the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Part III, Test N.1.
Remarks	The main test was omitted as the preliminary screening test was negative. This was due to the localised burning or glowing of the test item with practically no spreading.
Test Facility	BASF (2017b)

**Autoignition Temperature**

Not self-igniting

Method	Test performed in accordance with the test method described in the VDI 2263, part 1, chapter. 1.4.1, 1990
Remarks	The test item sample and a reference sample (graphite), each of 10 ml volume, are heated at a rate of 1 K/min in an air stream. No self-heating up to the melting point was observed.
Test Facility	BASF (2017b)

**Explosive Properties**

Not explosive

Method	Differential Scanning Calorimetry (DSC) Method (In house method).
Remarks	The heat flow from or to the test item sample is measured as a function of the furnace temperature which is the temperature difference between the test item sample and an inert substance, that is in thermal contact with the sample.
Test Facility	BASF (2017b)

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- BASF (2017b) Safety Engineering Study report (Study code: SIK-Nr. 17/1933, 24 November 2017) BASF SE, D-67056 Ludwigshafen (Unpublished report submitted by the notifier)
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