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

**FULL PUBLIC REPORT**

**Polymer in DUROXYN VEF 2406w/45WA**

This Assessment has been compiled in accordance with the provisions of the *Industrial Chemicals (Notification and Assessment) Act 1989* (Cwlth) (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 Ageing, 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 Water Resources.

For the purposes of subsection 78(1) of the Act, this Full Public Report may be inspected at our NICNAS office by appointment only at 334-336 Illawarra Road, Marrickville NSW 2204.

This Full Public Report is also available for viewing and downloading from the NICNAS website or available on request, free of charge, by contacting NICNAS. For requests and enquiries please contact the NICNAS Administration Coordinator at:

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**Director  
NICNAS**

## **TABLE OF CONTENTS**

FULL PUBLIC REPORT .....	3
1. APPLICANT AND NOTIFICATION DETAILS .....	3
2. IDENTITY OF CHEMICAL .....	3
3. COMPOSITION.....	4
4. PHYSICAL AND CHEMICAL PROPERTIES .....	4
Discussion of Observed Effects .....	4
5. INTRODUCTION AND USE INFORMATION .....	5
6. HUMAN HEALTH IMPLICATIONS.....	6
6.1. Exposure assessment .....	6
6.1.1. Occupational exposure.....	6
6.1.2. Public exposure.....	6
6.2. Human health effects assessment .....	7
6.3. Human health risk characterisation.....	7
6.3.1. Occupational health and safety .....	7
6.3.2. Public health .....	7
7. ENVIRONMENTAL IMPLICATIONS .....	7
7.1. Environmental Exposure & Fate Assessment.....	7
7.1.1. Environmental Exposure.....	7
7.1.2. Environmental fate .....	9
7.1.3. Predicted Environmental Concentration (PEC).....	9
7.2. Environmental effects assessment .....	9
7.2.1. Predicted No-Effect Concentration.....	9
7.3. Environmental risk assessment.....	9
8. CONCLUSIONS – SUMMARY OF RISK ASSESSMENT FOR THE ENVIRONMENT AND HUMAN HEALTH .....	9
8.1. Hazard classification.....	9
8.2. Human health risk assessment.....	9
8.2.1. Occupational health and safety .....	9
8.2.2. Public health .....	9
8.3. Environmental risk assessment.....	9
9. MATERIAL SAFETY DATA SHEET.....	10
10. RECOMMENDATIONS.....	10
11. REGULATORY OBLIGATIONS .....	10
<u>APPENDIX A: PHYSICO-CHEMICAL PROPERTIES</u> .....	12
<u>BIBLIOGRAPHY</u> .....	13

## **FULL PUBLIC REPORT**

<b>Polymer in DUROXYN VEF 2406w/45WA</b>
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### **1. APPLICANT AND NOTIFICATION DETAILS**

#### APPLICANT(S)

Cytec Australia Holdings Pty Limited (ABN: 45 081 148 629)  
Suite 1, Level 1 Norwest Quay  
21 Solent Circuit  
Norwest Business Park  
Baulkham Hills  
NSW 2153

#### NOTIFICATION CATEGORY

Limited: Synthetic polymer with NAMW  $\geq 1000$

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

Data items and details claimed exempt from publication:

- Chemical names
- Other names
- CAS Number
- Molecular formula
- Structural Formula
- Molecular weight
- Spectral data
- Purity
- Identity of toxic or hazardous impurities
- % Weight of toxic of hazardous impurities
- Non-hazardous impurities
- Identity of additives/adjuvants
- % Weight of additives/adjuvants
- Manufacture/import volume
- Concentration of the notified polymer in imported and formulated products

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

- Variation to the schedule of data requirements is claimed as follows:
- Vapour pressure
- Hydrolysis as a function of pH
- Partition co-efficient
- Absorption/Desorption
- Dissociation constant
- Flammability limits
- Autoignition temperature

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

None

#### NOTIFICATION IN OTHER COUNTRIES

None

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

#### MARKETING NAME(S)

Duroxyn® VEF 2406w/45WA (contains the notified polymer at 40-60% in an emulsion)

#### ANALYTICAL DATA

Reference IR and GPC spectra were provided. The level of a residual monomer was determined by gas chromatography.

### 3. COMPOSITION

#### DEGREE OF PURITY

>90%

#### HAZARDOUS IMPURITIES/RESIDUAL MONOMERS

The hazardous residual monomers are present at levels below the concentration cut-offs for classification.

#### DEGRADATION PRODUCTS

None Known.

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

The residual monomers may be lost to the environment when the polymer or product containing it is in the liquid form. However, once the coated products are cured, the monomers will be trapped within the solid matrix.

### 4. PHYSICAL AND CHEMICAL PROPERTIES

The data below are for Duroxyn® VEF 2406w/45WA containing 40-60% of the notified polymer, unless otherwise stated.

Appearance at 20°C and 101.3 kPa

Yellow to brown liquid

Property	Value	Data Source/Justification
Melting Point/Freezing Point	-5 °C	MSDS
Boiling Point	60-100°C	MSDS
Density	1068 kg/m <sup>3</sup> at 20°C	Measured
Vapour Pressure	Not determined	Expected to be low due to high molecular weight
Water Solubility	≤ 10 mg/L	Estimated
Hydrolysis as a Function of pH	Not determined	Not expected to significantly modify the environmental fate of the polymer
Partition Coefficient (n-octanol/water)	Not determined	The water-oil partition coefficient is expected to be high based on the indicated low water solubility of the notified polymer.
Adsorption/Desorption	Not determined	Expected to partition to soil and sewage sludge
Dissociation Constant	Not determined	Not expected to significantly modify the environmental fate of the polymer
Particle Size	Not applicable	Imported as an emulsion
Flash Point	>94°C	Measured
Flammability	Not determined	Not expected due to water-based emulsion
Autoignition Temperature	Not determined	Not expected due to water-based emulsion
Explosive Properties	Not predicted to be explosive	Estimated

#### Discussion of Observed Effects

For full details of the physical-chemical properties tests please refer to Appendix A.

#### Reactivity

The notified polymer is stable under normal environmental and use conditions.

## 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. It will be imported as a component of DUROXYN®VEF 2406w/45WA at a concentration of 40-60%.

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

Year	1	2	3	4	5
Tonnes	< 10	< 20	< 30	< 40	< 50

#### PORT OF ENTRY

Sydney

#### IDENTITY OF MANUFACTURER/RECIPIENTS

Industrial coatings formulators.

#### TRANSPORTATION AND PACKAGING

DUROXYN®VEF 2406w/45WA will be imported by ship in 200 L sealed metal drums. It will be transported from the wharf to Cytec by road for warehousing before being supplied to coating formulators. Following reformulation, the final coating products will be packaged in 4L, 10L, 20L, and 200L drums.

#### USE

DUROXYN®VEF 2406w/45WA will be used in the manufacture of coatings for substrates such as wood, metal and concrete. The finished coating will contain the notified polymer at < 30%.

#### OPERATION DESCRIPTION

##### *Coating formulation*

The polymer solution containing up to 60% notified polymer will be pumped from 200 L drums into the closed mixer via a lance the operator places in the drum. The lance is manually transferred from drum to drum until the required amount of the polymer solution has been added to the mixer. Following mixing with other ingredients, approximately 500 mL of the formulated coating (containing the notified polymer at up to 30%) will be sampled for testing. When approved the formulated coating will be filled through dedicated pipework and filling equipment into closed head 200 L drums and other size containers. The filling equipment automatically places a short fill pipe through the bung hole in the top of the containers and fills them.

##### *QC testing*

The operator will adjust the coating containing the notified polymer and spray wood or metal panels for baking and testing.

##### *Coating application*

The majority (90%) of the water based coating products containing the notified polymer will be sold to industry for application to substrates such as wood, metal and concrete. Application of coatings will be mainly by industrial airless spray application. The industrial spray coatings will be typically applied in spray booths. When touch-up is required, the coating may be applied by painter using brush or roller.

Some commercial coating applications are expected to take place on already installed concrete/timber. Applications to concrete would be by a long handled- roller. Application to timber surfaces would be by roller or in some cases paint brushes.

A small proportion (up to 10%) of the water-based coating will be purchased by the public for 'do-it-yourself' applications. It is expected that these coatings will be applied by rollers or brushes.

## 6. HUMAN HEALTH IMPLICATIONS

### 6.1. Exposure assessment

#### 6.1.1. Occupational exposure

##### *Number and Category of Workers*

<i>Category of Worker</i>	<i>Number</i>	<i>Exposure Duration</i>	<i>Exposure Frequency</i>
<i>Transport and Storage</i>	2	2-3 hours/day	4 days/year
<i>Coating formulation</i>			
Process workers	3	8 hours/day	4 days/year
Quality control workers	1	8 hour/day	4 days/year
Cleaning and maintenance staff	2	8 hour/day	4 days/year
<i>End use</i>			
Commercial applicators	> 1000	8 hours/day	30 days/year

##### *Exposure Details*

###### Transport and storage

There is little potential for occupational exposure to the notified polymer during transport and storage of the imported product or the finished product coatings except in the event of an accident.

###### Coating formulation

Dermal and ocular exposure to the notified polymer (concentration up to 60%) may occur during the transfer of the imported product into mixing vessels, filling operations for the coating product, equipment cleaning and maintenance. Engineering controls (automated filling processes) and personal protective equipment (PPE), such as impervious gloves, safety goggles and coveralls, are typically in place to reduce the potential exposure. Inhalation exposure is unlikely as the notified polymer is expected to be non volatile and the formation of aerosols is not expected.

###### QC Testing

There is potential for dermal exposure to the notified polymer at a concentration of up to 30% during sampling and testing of the coating formulation. In addition, there is potential for inhalation exposure during spray application. Workers are expected to be provided with appropriate PPE.

###### Commercial applications

Dermal and ocular exposure to the notified polymer at up to 30% during industrial coating applications may occur when the coatings are mixed and sprayed and during the cleaning of the equipment. The industrial spray coatings will be typically applied in spray booths so respirators, gloves, coveralls, and goggles (or safety glasses) and filtered exhaust systems will tend to be used. Therefore, exposure to the notified polymer will be minimised. However, the levels of ventilation present in the spray booth may vary between workshops. In smaller shops, spray applications may occur outside of a spray booth.

When using brush or rollers the worker may come into contact with the notified polymer through dermal and ocular routes. Workers typically wear coveralls and safety glasses to minimise exposure.

#### 6.1.2. Public exposure

The public is unlikely to be exposed to the notified polymer during transport, storage, and formulation, except in the event of an accidental spill.

Small proportion (<10%) of the coating product containing up to 30% of the notified polymer will be sold to the general public for 'do-it-yourself' type applications. Household users of the coating may be exposed to drips and splashes. The polymer cures as it dries, so public contact with the notified polymer following applications is unlikely to result in significant exposure.

## **6.2. Human health effects assessment**

No toxicity data were submitted.

The high molecular weight of the notified polymer should preclude absorption across biological membranes and systemic toxicity is not expected. As no toxicological data have been submitted the notified polymer cannot be classified under the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004).

Some hazardous residual monomers are present in the notified polymer. However, the levels are below the concentration cut-offs for classification.

## **6.3. Human health risk characterisation**

### **6.3.1. Occupational health and safety**

The risk to workers handling products containing the notified polymer during coating formulation is expected to be low given the expected low toxicity and the expected low exposure providing the PPE and engineering controls are used as described.

During spray applications, exposure to aerosols is minimised by the expected use of PPE and spray booths. Workers' exposure to aerosols could be higher at workplaces where spraying occurs outside a spray booth. Manual applications by rollers and brushes may result in increased exposure, especially via the dermal route. However, based on the expected low toxicity of the notified polymer (having MW>1000 with low concentration of low MW species <1000), the risk to workers can be considered low if appropriate controls such as adequate ventilation and PPE are in place at all workplaces where manual applications occur. Any health risks would be further reduced by spraying being carried out according to the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999).

Overall, the risk to workers can be considered low provided appropriate controls (PPE and engineering controls where possible) are in place at workplaces where the coating containing the notified polymer are used.

### **6.3.2. Public health**

Consumer users of the coating product containing the notified polymer are unlikely to take precautions to minimise exposure. Thus, they will have intermittent dermal exposure, and possibly accidental ocular and oral exposure, to the notified polymer. However, the risk will be limited by the expected low toxicity of the notified polymer and that the frequency of uses is expected to be less than workers.

## **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. Release to the environment during shipping, transport and warehousing will only occur in the unlikely event of accidental spills or leaks of the 200 L drums.

There is a potential for release during formulation of the water-based coatings. The formulation process will take place at the customer site and in the unlikely event that a spill occurs it will be contained by existing plant bunding and collected for disposal to landfill. It is estimated that up to 1% of the polymer may be lost due to spills and leaks. Equipment washings from formulation processes may result in release of < 1.5% of notified polymer to the environment. These washings are collected into holding tanks, which are emptied on a regular basis by licensed contractors for disposal to landfill. It is estimated that < 0.5% of the polymer will remain as residues in the empty import drums which are disposed of to landfill.

#### RELEASE OF CHEMICAL FROM USE

Coating formulation containing the notified polymer will be applied to substrates predominantly by professional applicators and are primarily targeted for use in industrial airless spray application to wood, metal and concrete. A piston pump using an air pressure of around 3-4 bars operates the airless spray. A 30% overspray from this process is expected (equivalent to 27% wastage of the notified polymer, based on the use of 90% of the imported quantity of notified polymer for commercial spray applications), but this process will be performed in a spray booth with water downdraft. The waste generated from overspray will be collected and treated by flocculation before discharge to the sewer as trade waste. The flocculation step should remove almost all the polymer in the overspray to landfill. In the event that a small amount of the notified polymer is released to the sewer, it will be further treated at the municipal sewage treatment works before discharge to the aquatic environment. At the treatment works most of the polymer should be contained in the sludge, which will be incinerated or sent to landfill. Spray application equipment will be cleaned with water and this residue is also collected and disposed of as described above.

Release of the notified polymer as a result of cleaning of brushes and rollers from commercial applications, would release up to 1.5 % of the imported notified polymer annually. Application brushes and rollers will be cleaned with water. Generally, wastes generated during applications will be allowed to dry and the solids then disposed of to landfill. However, some of the cleaning effluent may be disposed of via the sewer. Spilled materials will be collected and sent to landfill. The residue in empty containers will be allowed to dry and the containers will be disposed of to landfill.

It is estimated that < 0.5% of the notified polymer contained in coating products would remain as residue in the steel containers after emptying. This will ultimately be disposed of to landfill along with the containers.

Domestic 'do-it-yourself' users are expected to apply the coating product predominantly by brush or roller. It is estimated that 0.3% (150 kg) of the imported quantity of notified polymer may end up in the sewer each year when paint equipment is cleaned by these users. A further 0.5% of notified polymer is expected to be disposed of with empty containers to landfill.

#### RELEASE OF CHEMICAL FROM DISPOSAL

The notified polymer on treated surfaces is bound in the coating matrix and will not be available for direct release to the environment. It is noted that abrasion of coated surfaces by, for example, sanding painted wood will generate solid particles containing the notified polymer, but these will be disposed of to landfill. Disposal of treated materials such as timber may be through landfill or recycling, and the fate of the coating will be related to that of the timber.



### **7.1.2 Environmental fate**

The notified polymer will be used mostly in commercial applications with a minor use in domestic ('do-it-yourself') applications. The commercial applications will predominantly involve spray coating the polymer as a component of coating product applied to wood, metal and concrete surfaces in industrial spray booths. Significant quantities of the notified polymer (27%) will be lost as overspray which will be flocculated and disposed of to landfill. The polymer is expected to bind strongly to mineral particles and organic matter and will therefore not be mobile. The polymer applied to surfaces will be irreversibly bound in the applied coating matrix and its fate will therefore be determined by the fate of the treated article. The disposal of these coated materials and flocculated overspray wastes to landfill is expected to result in slow degradation of the polymer to simple carbon and nitrogen containing compounds by biotic and abiotic processes. There is some potential for release of the notified polymer into stormwater drains and the sewer system from domestic applications. However, in storm water drains the polymer is expected to bind strongly to soil and organic material and will therefore be immobilised. Any notified polymer that reaches a sewage treatment plant is expected to partition to sludge and will be disposed of to landfill. Based on its chemical structure, the notified polymer is not considered to be a bioaccumulation hazard.

No environmental fate data were submitted.

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

No significant concentrations of the notified polymer are expected in the water based on the limited pathways for release to the aquatic environment, its low water solubility, and the anticipated partitioning of the polymer to solid surfaces. The calculation of a Predicted Environmental Concentration is therefore not justified in this case.

## **7.2. Environmental effects assessment**

No ecotoxicity data were submitted.

### **7.2.1 Predicted No-Effect Concentration**

As no ecotoxicology data are available for this notified polymer, no PNEC has been calculated.

## **7.3. Environmental risk assessment**

The notified polymer will not be released in significant quantities to the aquatic environment and is not expected to be mobile in the soil compartment. The possibility of significant exposure of aquatic organisms to the notified polymer is therefore low. On this basis, the environmental risk of the notified polymer is considered to be acceptable.

## **8. CONCLUSIONS – SUMMARY OF RISK ASSESSMENT FOR THE ENVIRONMENT AND HUMAN HEALTH**

### **8.1. Hazard classification**

As no toxicological data have been submitted the notified polymer cannot be classified under the NOHSC *Approved Criteria for Classifying Hazardous Substances*.

## **8.2. Human health risk assessment**

### **8.2.1. Occupational health and safety**

Under the conditions of the occupational settings described, the risk to workers is considered to be acceptable.

### **8.2.2. Public health**

When used in the proposed manner the risk to the public is considered to be acceptable.

## **8.3. Environmental risk assessment**

On the basis of the low potential for aquatic exposure and its reported use pattern, the notified polymer is not considered to pose a risk to the environment.

## 9. MATERIAL SAFETY DATA SHEET

The MSDS of the products containing the notified polymer provided by the notifier was reviewed by NICNAS and is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

## 10. RECOMMENDATIONS

### CONTROL MEASURES

#### Occupational Health and Safety

- Employers should implement the following safe practices to minimise occupational exposure during handling of products containing the notified polymer:
  - Avoid breathing spray.
  - Use of spray paints containing the notified chemical should be accordance with the NOHSC National Guidance Material for Spray Painting (NOHSC, 1999) or relevant State and Territory Codes of Practice.
  - Avoid skin and eye contact, especially when manual applications occur and no spray booths are available.
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to products containing the notified polymer:
  - Chemical resistant gloves
  - Protective clothing
  - Safety goggles

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

- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing the notified polymer are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances*, workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

#### Environment

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

## 11. REGULATORY OBLIGATIONS

This risk assessment is based on the information available at the time of notification. The Director may call for the reassessment of the polymer 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 polymer, 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 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 polymer has a number-average molecular weight of less than 1000.

or

- (2) Under Section 64(2) of the Act; if
  - the function or use of the polymer has changed from coating, or is likely to change significantly;
  - the amount of polymer being introduced has increased from more than 50 tonnes, or is likely to increase, significantly;
  - if 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.

## **APPENDIX A: PHYSICO-CHEMICAL PROPERTIES**

The tests (density, water solubility and flashpoint) were performed for Duroxyn® VEF 2406w/45WA.

**Density** 1068 kg/m<sup>3</sup> at 20°C

METHOD	DIN EN ISO 2811-2: Determination of density-Part 2: Immersed body (plummet) method.
Remarks	A beaker was filled with the sample and placed on an analytical balance. A sphere with a known volume (3334 mL) was clamped to a stand and then immersed in the sample. The density was obtained by dividing the gain in weight due to the immersion of the body by the known volume of the body.
TEST FACILITY	Cytec Surface Specialties (2007)

**Water Solubility** ≤ 10 mg/L

METHOD	The water solubility was estimated by a semi-quantitative flask method. The saturation level of the polymer in solution was estimated from the transmittance of light through the test solution at a wavelength of 620 nm.
TEST FACILITY	Cytec Surface Specialties (2007)

**Hydrolysis as a Function of pH** Not determined

Remarks	The notified polymer is susceptible to hydrolysis in the environmentally relevant pH range 4-9 at ambient temperature. However, hydrolysis is not expected to significantly alter the environmental fate of the polymer because of its low water solubility and overall chemical structure.
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**Partition Coefficient (n-octanol/water)** Not determined

Remarks	The water-oil partition coefficient is expected to be high based on the indicated low water solubility of the notified polymer.
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**Adsorption/Desorption** Not determined

Remarks	The chemical structure, low water solubility, and intended use of the notified polymer indicate that it will bind strongly to materials rich in organic carbon and/or minerals. Therefore, the polymer is expected to partition onto sediment and sewage sludge.
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**Dissociation Constant** Not determined

Remarks	The notified polymer is capable of dissociation in the environmentally relevant pH range 4-9. However, dissociation is not expected to significantly alter the environmental fate of the polymer in this pH range because of its low water solubility and overall chemical structure.
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**Flash Point** > 94°C

METHOD	DIN EN ISO 2719 (Pensky-Martens closed cup method)
Remarks	No details of the test method were provided. A flash point value of 100°C (boiling point of main solvent water) was pre-estimated. The test was stopped at 94°C due to massive foam formation and start of boiling. No flash point was detected before the measurement was stopped.
TEST FACILITY	Cytec Surface Specialties (2007)

**Explosive Properties** Not predicted to be explosive

Remarks	The notified polymer contains no functional groups that would infer explosive properties.
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