File No LTD/1149

29 September 2004

NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME (NICNAS)

FULL PUBLIC REPORT

Polymer in EFKA-4300

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Ι	Director					
(Chemicals N	Notification a	nd Assessme	nt		

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FULL PUBLIC REPORT

Polymer in EFKA-4300

1. APPLICANT AND NOTIFICATION DETAILS

APPLICANT(S)
Ciba Specialty Chemicals Pty Ltd (ABN 97 005 061 469)
235 Settlement Rd,
Thomastown VIC 3074

Multichem Pty Ltd (ABN 47 006 115 886) Suite 6, 400 High Street, Kew VIC 3101

NOTIFICATION CATEGORY

Limited: Polymer with NAMW ≥ 1000 (greater than 1 tonne per year).

EXEMPT INFORMATION (SECTION 75 OF THE ACT)
Data items and details claimed exempt from publication:
Chemical identity
Import volume
Product formulation details
Identity of customers.

VARIATION OF DATA REQUIREMENTS (SECTION 24 OF THE ACT) Variation to the schedule of data requirements is claimed as follows: Some physico-chemical properties.

PREVIOUS NOTIFICATION IN AUSTRALIA BY APPLICANT(S) None

NOTIFICATION IN OTHER COUNTRIES None

2. IDENTITY OF CHEMICAL

OTHER NAME(S)
Acrylic block-copolymer

MARKETING NAME(S) Component of EFKA-4300

SPECTRAL DATA

ANALYTICAL IR, NMR. METHOD

METHODS OF DETECTION AND DETERMINATION

Remarks Not supplied. The notifier states that the levels of residual monomers and impurities have

been analysed by GC or HPLC.

3. COMPOSITION

DEGREE OF PURITY > 90 %

HAZARDOUS IMPURITIES/RESIDUAL MONOMERS

All hazardous impurities and residual monomers are present at below the relevant cut offs for classification of the notified polymer as a hazardous substance

NON HAZARDOUS IMPURITIES/RESIDUAL MONOMERS (>1% by weight) None

ADDITIVES/ADJUVANTS

None

DEGRADATION PRODUCTS

No dangerous decomposition products 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 state. However, once the surface coatings are cured, the monomers will be trapped in the solid matrix.

4. INTRODUCTION AND USE INFORMATION

Mode of Introduction of Notified Chemical (100%) Over Next 5 Years The notified polymer will be imported as part of the product EFKA-4300.

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

Year	1	2	3	4	5
Tonnes	1-3	1-3	1-3	3-10	3-10

Use

Additive in solvent based automotive paints.

5. PROCESS AND RELEASE INFORMATION

5.1. Distribution, transport and storage

PORT OF ENTRY Melbourne

TRANSPORTATION AND PACKAGING

EFKA-4300 containing the notified polymer will be imported by sea in 25 kg pails and 200 kg steel drums. The containers will be transported by road to a storage site, and then supplied to paint manufacturers in Australia, for formulation into a range of paints. The finished paints will be packaged in 1 L, 4 L, and 10 L steel paint cans and 200 L drums. The paints will be distributed to numerous automotive companies within Australia.

5.2. Operation description

The notified polymer will not be manufactured in Australia, but will be imported as a blend in methoxypropylacetate and dioctyladipate in 25 kg pails and 200 kg steel drums. EFKA-4300 containing the notified polymer will be transported to a warehouse for storage before it is sent to paint manufacturers for formulation into paint products. Truck drivers will transport the sealed EKKA-4300 containers by road from the wharf to the warehouse and then as needed to the customer warehouse.

The polymer solution will be reformulated into paint products at the paint manufacturing site.

Formulation of the notified polymer into paint products or pre-mixes will involve transfer of notified polymer by metered dosing to a mixing vessel and mixing polymer solution and other ingredients in a sealed vessel fitted with a high speed mixer and local ventilation system. Each batch will be quality checked and adjustments made as required. The resultant paint will be filtered prior to being dispensed into 1 L, 4 L and 10 L steel paint cans and pails using automated filling machine under exhaust ventilation. Paint products containing the notified polymer will be warehoused at the notifier's site prior to distribution to customer sites.

At the end user sites the paint containing the notified polymer will used in the automotive industry, for both original equipment manufacture (OEM) and refinishing of components. At the customer sites the paint will be stirred and diluted then placed in a spray gun. The object to be primed with the paint will be sprayed then heat cured, resulting in the painted article.

5.3. Occupational Exposure

Number and Category of Workers

Category of Worker	Number	Exposure Duration	Exposure Frequency
Transportation and Storage	_		
Transporting from dock to	3	2-3 hours/day	10-15 days/year
Notifier's site for warehousing			
(loading/unloading trucks)			
Paint manufacture			
Workers involved in weighing,	6	30 min to 6 hrs/day	4 days/week
mixing and bead milling			4 weeks/year
operations.			
Workers involved in filling cans of coating	4	3 hrs/day	4 days/week for 4 week working period
Quality control/chemists and	4-8	1 hr/day	4 days/week for 4 week
technical service			working period
Cleaning operations	2	30 min/day	4-days/week for 4 week
			working period
Paint application			
Automotive industry	> 1000	8 hrs/day	5 days/week

Exposure Details

Transport and storage

Waterfront, transport and warehouse workers are not expected to be exposed to the notified polymer except in the case of an accident involving spillage of the EFKA-4300 containing the notified polymer at 64% concentration. Spills are cleaned up by absorbing with liquid-binding material (sand, diatomite, acid binders, universal binders or sawdust) and recovered into containers for disposal in accordance with local government regulations.

Paint formulation

During paint formulation there is possible dermal and ocular exposure of workers to drips, spills and splashes of EFKA-4300 or of formulated paint containing < 10% of the notified polymer. Such exposure could occur during charging of the mixing tank, taking QC testing samples and when plant and equipment is cleaned or maintained. Engineering controls such as metered dosing and enclosed mixing tanks are expected to be in place to minimise dermal/ocular exposure. Personal protective equipment (PPE) is expected to be worn by workers during this process - coveralls, goggles and impervious gloves.

During filling of cans, possible dermal/ocular exposure to paint containing < 10% of the notified polymer may result from drips and spills when connecting filling lines, or during equipment malfunction. Workers wear coveralls, goggles and impervious gloves.

Maintenance workers and laboratory staff may also encounter dermal/ocular exposure during equipment maintenance and testing processes. To minimise exposure, coveralls, goggles and gloves are worn.

Inhalation exposure during formulation or filling of paint is unlikely as aerosols are not expected to be

formed and exhaust ventilation systems are in place to control exposure to other components of the paints.

End-use of paints in spray painting

Workers exposed during end-use of the formulated paints will mostly consist of spray painters preparing and applying the formulated paint coatings to surfaces (e.g. automotive parts), and cleaning equipment after use. As the paints are to be used in both OEM and refinish operations, there could be variations in the scale and sophistication of the spray painting operations, and the controls in place that would affect exposure.

The final concentration of the notified polymer in paints will be < 10%, reducing the potential for worker exposure. Dermal exposure is possible during preparation of paint, which involves stirring, transfer and dilution steps. Aerosols may be formed during spray application and therefore inhalation exposure may be possible. To minimise exposure during end use, the paint is diluted and applied in a well ventilated, down draft spray booth with an effective fume extraction system. Workers also wear anti-static footwear and flame retardant overalls, impervious gloves, eye protection and an air fed breathing mask or respirator if local exhaust ventilation is inadequate.

Spray painting may be carried out without the full range of controls mentioned above, increasing exposure.

Worker exposure to the notified polymer in dried paints is likely to be minimal, as the polymer will be encapsulated as part of the cured paint film.

5.4. Release

RELEASE OF CHEMICAL AT SITE

Local operations will include transport and storage, formulation, filling and packaging and application by end-users using spray gun.

During storage and paint manufacture the notified polymer will be released in the following ways:

Spills - up to 1%, up to 100 kg annually to landfill

Import container residue - less than 2%, up to 200 kg annually to waste contractor

During paint formulation - up to 1%, up to 100 kg generally to next batch

During paint formulation, it is anticipated that there will be minimal release of the notified polymer during manual transfer from the storage containers to the mixers and during filling of paint into containers or during blending since it is undertaken in enclosed systems under exhaust ventilation and in a bunded area. Spills will be within bunded areas and collected with inert absorbent material (eg sand) and placed in a sealable container ready for disposal. The process equipment, blending tanks and mixers will be cleaned with suitable solvent which is collected and used in the next batch, if possible, otherwise it will be disposed off-site.

Import containers will be rinsed with the rinsate being used in the paint formulation and the rinsed containers will be disposed of off-site.

RELEASE OF CHEMICAL FROM USE

Release of the notified polymer to the environment as a result of its use in the automotive industry is expected to be minimal, unless an accidental spillage occurs, and include:

Spills

- up to 1%, up to 100 kg annually to landfill

Container residue

- up to 2.5 %, up to 250 kg annually to landfill

- up to 30%, up to 3000 kg annually to landfill

Equipment cleaning

- up to 5%, up to 500 kg annually to waste contractor

All spills will be contained, collected with inert absorbent material (eg sand) and placed in a sealable container ready for disposal. Since the modern high volume low pressure (HVLP) spray guns have a

70% spray efficiency while the older high pressure guns have an efficiency of only 30%, the former are used more frequently and have been used in the above overspray release estimation. As the paint will be applied within a specialised spray booth, all overspray will be contained and collected for disposal.

Any paint residue in empty paint containers will be allowed to dry and then disposed of with the container.

Painting equipment will generally be cleaned with solvent. This effluent will be collected and reused if possible otherwise it will be disposed of off-site.

5.5. Disposal

The rinsed import containers, 25 kg pails and 200 kg steel drums, and steel end-user paint cans, containing any residual notified polymer (up to 250 kg annually), will be disposed to landfill as industrial waste. At the paint manufacturing plants effluent generated during container rinsing and equipment cleaning effluent (up to 300 kg of waste notified polymer annually) will be collected and reused where possible. Otherwise it will be disposed of to a liquid waste facility by a licensed contractor (eg for solvent recovery). A further 500 kg will go to liquid waste contractors from the cleaning of paint application equipment. There will be no release to sewer.

Any spilt material (containing up to 200 kg annually of the notified polymer) will be is disposed of to landfill. The spray booth filters are replaced every 2 to 4 months and the used filters (containing up to 3000 kg of notified polymer annually) will be disposed of to landfill. Any effluent from wet scrubbers, if used, will go to licensed liquid water facilities.

5.6. Public exposure

The general public is not expected to come into contact with EFKA-4300 or products containing it, except in the case of transport accidents where the packaging was breached.

Once the paint containing the notified polymer is applied to the substrate in the automotive industry, the notified polymer is bound in an insoluble polymeric matrix and is not bioavailable.

6. PHYSICAL AND CHEMICAL PROPERTIES

Unless otherwise stated, physico-chemical properties refer to EFKA-4300 rather than the notified polymer.

Appearance at 20°C and 101.3 kPa

Clear brownish viscous liquid.

Boiling Point 146°C (for solvent methoxypropyl acetate)

Density 1050 kg/m^3

Remarks Method not specified.

Vapour Pressure 0.27 kPa (for solvent methoxypropyl acetate)

Water Solubility Low solubility

METHOD Qualitative testing only was carried out. A 50 g sample of EFKA-4300 was mixed

with an equivalent amount of water in a flask and heated to the boiling point of water. After cooling the result was a two-phase system (water lower phase and polymer upper phase). The ratio of the two phases did not change over a period of

several hours.

Remarks The presence of solvents (< 50%) in EFKA-4300 can affect the relevance of this

test. However, despite their presence, water solubility was still low.

The notified polymer is likely to be more soluble in acidic conditions.

TEST FACILITY Not stated.

Hydrolysis as a Function of pH

Not determined.

The notified polymer contains functional groups which may undergo hydrolysis under extreme temperature and pH conditions. However, under environmental conditions in the pH range of 4 to 9, hydrolysis is unlikely to occur.

Partition Coefficient (n-octanol/water)

Not determined.

The notifier has indicated that the notified polymer is expected to partition to the organic phase. This is supported by its apparent low water solubility.

Adsorption/Desorption

Not determined.

The notified polymer is expected to bind strongly to organic matter in soil due to its low water solubility and potential cationic form.

Dissociation Constant

Not determined

METHOD

Remarks

The notified polymer contains a tertiary nitrogen atom with pK_a ranging from 9.0 –

11.0.

Particle Size

Not applicable as in liquid medium.

Flash Point

45°C (for solvent methoxypropyl acetate)

Flammability Limits

(for solvent methoxypropyl acetate)

Upper: 10.8% Lower: 1.5%

Autoignition Temperature

Not self-igniting

Remarks

Statement by notifier

Explosive Properties

Not explosive, however formation of explosive air vapour

mixtures is possible.

Remarks

Statement by notifier.

Reactivity

Under normal conditions the polymer will not degrade or

depolymerise.

Remarks

Statement by notifer.

7. TOXICOLOGICAL INVESTIGATIONS

No toxicological data were submitted.

8. ENVIRONMENT

8.1. Environmental fate

No environmental fate data were submitted.

8.2. Ecotoxicological investigations

No ecotoxicological data were submitted.

9. RISK ASSESSMENT

9.1. Environment

9.1.1. Environment – exposure assessment

Exposure will only occur due to use of the notified polymer as it will not be manufactured in Australia. It will be reformulated into paints that will be used across Australia by professional trades people in the automotive industries, ie will not be available for general consumer use. The proposed use pattern and waste management indicate a low potential for environmental release of the notified polymer. Solid wastes (containing up to 3450 kg annually of the notified polymer) resulting from the paint manufacture and paint use will be collected and sent to landfill or incineration.

Liquid effluents (containing up to up to 800 kg) produced from paint formulation and use will be sent to liquid waste plants, including solvent recovery, where, due to its expected low water solubility, the notified polymer will end up in any resultant sludge which will be disposed of to landfill. A small amount of the notified polymer may be present in effluent discharged to sewer, which is expected to undergo further treatment prior to eventual discharge to the aquatic environment. The notified polymer has the potential to be cationic. Cationic polymers with a number average molecular weight greater than 1,000 are assumed to partition mainly to the solids phase and to be 90% removed relative to the total influent concentration. The remaining 10% is assumed to be discharged to receiving waters although much of this material is likely to be in the form of polymer sorbed to suspended solids (Boethling and Nabholz 1997). However, in the pH of the sewer, most will be in the undissociated form.

Following application and curing, the notified polymer is likely to be tightly cross-linked within an inert matrix. Due to its high molecular weight, the potential for bioaccumulation is very low.

9.1.2. Environment – effects assessment

No ecotoxicological data were provided for the notified polymer, thus a PNEC cannot be estimated. Following application and curing, the notified polymer will be within an inert matrix and be unavailable to organisms. However, being cationic any unbound polymer is likely to exhibit significant toxicity to aquatic organisms, particularly algae (Boethling and Nabholz 1997).

9.1.3. Environment – risk characterisation

The notified polymer will interact with other components to form a stable chemical matrix and, once dry, is expected to be immobile and pose little risk to the environment. After the useful life of painted article, the notified polymer will suffer the same fate as the article. If the article is recycled then the notified polymer will be destroyed during the heating process to release water vapour, oxides of carbon and nitrogen.

Within a landfill environment, the notified polymer (up to 3450 kg) contained in waste from paint manufacture and paint application, including cured paint, will be immobile and is expected to breakdown at a very slow rate.

The notified polymer is not likely to present a risk to the environment when it is stored, transported, used, recycled and disposed of in the proposed manner.

9.2. Human health

9.2.1. Occupational health and safety – exposure assessment

During transport and storage, worker exposure to EFKA-4300 containing the notified polymer or to products containing it, is expected to be very low, and would only occur if accidental spillage of the materials occurred.

During processing of EFKA-4300 into paint formulations there is potential for dermal/ocular exposure of workers. However standard engineering controls for formulation, eg enclosure and local exhaust ventilation, would limit this to incidental exposure. Exposure at this stage could occur to EFKA-4300 containing 64% of the notified polymer, or to paint formulations containing < 10% of the notified polymer.

Potential for exposure occurs at the end-use stage, when paint formulations containing < 10% of the notified polymer are prepared for application and sprayed onto automotive components. Dermal/ocular exposure is likely during cleaning of the equipment and during the small-scale preparation for spraying, which may involve stirring the paint, diluting with solvent, and transfer to the spray gun. During the spraying process itself, inhalation and possibly ingestion exposure is possible, because aerosols containing the notified polymer would be formed during atomisation of the paint. The extent of dermal/ocular and inhalation exposure will depend on the controls in place, including isolation and engineering measures. It is estimated that > 1000 workers will carry out spray painting using formulations containing the notified polymer. Some of this will occur at large facilities manufacturing new automotive components. Some will occur as refinishing at crash repairer shops which may vary in the type and effectiveness of spray booths or other equipment. While much of the spray painting may be carried out with a high level of controls, the possibility of less effective control measures and therefore higher worker exposure cannot be ruled out.

It should be noted that worker exposure to the notified polymer in paint would leave obvious staining, and would therefore be avoided by workers wherever possible.

Worker exposure to the notified polymer in dried paints is likely to be minimal, as the polymer will be encapsulated as part of the cured paint film.

9.2.2. Public health – exposure assessment

Once the paint containing the notified polymer is applied to the substrate in the automotive industry, the notified polymer is bound in an insoluble polymeric matrix and is not bioavailable. Therefore no significant dermal or inhalation exposure to the public is expected.

9.2.3. Human health - effects assessment

The high molecular weight of the notified polymer and low level of species of molecular weight < 1000 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, 2002).

However the notified polymer contains a residual monomer that is a skin sensitiser. This monomer is present in the commercial product EFKA-4300 at a significant level, but below the cut-off level for classification in the NOHSC List of Designated Hazardous Substances (NOHSC, 1999a).

Therefore EFKA-4300 containing the notified polymer may produce sensitisation on skin contact.

9.2.4. Occupational health and safety – risk characterisation

The health effects of the notified polymer have not been characterised. Its absorption into the body is expected to be low because of its high molecular weight. However it may have skin sensitising effects because it contains a significant level of a residual monomer that is a skin sensitiser. The level of this monomer present is lower than the cut-off concentration for classification under the NOHSC *List of Designated Hazardous Substances* (NOHSC, 1999a).

The notified polymer will be imported in 25 kg pails and 200 L drums as a 64% solution in solvents as EFKA-4300. It will be used as an additive in industrial automotive paints for spray application, in both original equipment manufacture (OEM) and refinishing applications.

Dermal/ocular exposure to the notified polymer may occur during paint manufacture and paint application by spray painting. In addition inhalation and possibly ingestion exposure may also occur during spray painting.

During formulation exposure would be reduced by engineering controls such as enclosed tanks, but some risk of skin sensitisation remains through incidental skin contact with EFKA-4300 or paint containing the notified polymer. This risk would be further reduced by use of protective clothing including gloves.

In spray painting both engineering controls such as spray booths and full personal protective equipment are needed to reduce the exposure and the risk of skin sensitisation to acceptable levels. The risk would be further reduced by spray painting being carried out according to the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999b).

Once the final paint mix has hardened, the notified polymer is bound within the matrix and unavailable for exposure. Therefore, should exposure occur, the risk of health effects from the polymer is low.

Overall the health risk to workers is considered low, if appropriate engineering controls are in place to prevent exposure.

9.2.5. Public health – risk characterisation

Once the paint containing the notified polymer is applied to the substrate in the automotive industry, the notified polymer is bound in an insoluble polymeric matrix and is not bioavailable. Therefore no significant exposure to the public is expected.

10. CONCLUSIONS – ASSESSMENT LEVEL OF CONCERN FOR THE ENVIRONMENT AND HUMANS

10.1. Hazard classification

Based on the available data the notified chemical is not classified as a hazardous substance under the NOHSC *Approved Criteria for Classifying Hazardous Substances*.

and

As a comparison only, the classification of notified polymer using the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS) (United Nations, 2003) is presented below. This system is not mandated in Australia and carries no legal status but is presented for information purposes.

Based on available data the notified polymer is not classified for health effects under the GHS. For the environment it is not possible to categorise the notified polymer according to the GHS.

10.2. Environmental risk assessment

The notified polymer is not considered to pose a risk to the environment based on its reported use pattern.

10.3. Human health risk assessment

10.3.1. Occupational health and safety

There is Low Concern to occupational health and safety under the conditions of the occupational settings described.

10.3.2. Public health

There is Negligible Concern to public health when used as a paint additive.

11. MATERIAL SAFETY DATA SHEET

11.1. Material Safety Data Sheet

The MSDS of the product containing the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). It is published here as a matter of public record. The accuracy of the information on the MSDS remains the responsibility of the applicant.

11.2. Label

The label for the product containing the notified polymer provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

12. RECOMMENDATIONS

CONTROL MEASURES
Occupational Health and Safety

- Employers should implement the following isolation and engineering controls to minimise occupational exposure to the notified polymer:
 - Closed tanks and lines for formulation and filling of paint containing the notified polymer;
 - Use of engineering controls in spray painting to minimise exposure of workers.
- Employers should implement the following safe work practices to minimise occupational exposure during handling of the notified polymer;
 - Avoid splashing, spills and generation of aerosols during formulation and filling processes:
 - Spray application of paint containing the notified polymer should be in accordance with the NOHSC National Guidance Material for Spray Painting (NOHSC, 1999b)
 - Workers using spray products containing the notified polymer should be instructed in their proper handling and use, including information about the additional risks posed by spray application.
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the notified polymer:
 - Protective gloves
 - Safety glasses or goggles
 - Industrial clothing
 - Respiratory protection during spray painting, or if aerosols are formed
 - Full body protection during spray painting

Guidance in selection of personal protective equipment can be obtained from

Australian, Australian/New Zealand or other approved standards.

- The MSDS for EFKA-4300 containing the notified polymer should be altered to include information on possible health effects from a residual monomer that is a skin sensitiser. It is recommended that the Acute Health Effects –Skin section of the MSDS include the statement "May cause sensitisation by skin contact as low levels of a sensitising chemical are present" in place of the first sentence of that section, and the first word of the second sentence of the section.
- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing the notified chemical 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 following control measures should be implemented by paint manufactures and warehouse sites to minimise environmental exposure during paint formulation and storage of the notified polymer:
 - All process equipment and storage areas should be bunded.

Disposal

 The notified polymer should be disposed of to landfill for solids and to licensed waste contractors for liquids.

Emergency procedures

- Spills/release of the notified polymer should be contained by soaking up with inert
 absorbent material and dispose of as special waste in compliance with local and State
 regulations as recommended in the MSDS.
- Use detergent in cleaning up.
- Prevent product from entering drains.

12.1. Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under Subsection 64(1) of the Act; if
 - Due to the potential cationic nature of the notified polymer, there are any changes
 to the use pattern which significantly increase the potential for aquatic exposure,
 whereby full ecotoxicity studies for fish, daphnia and algae would need to be
 submitted for assessment.

or

- (2) Under Subsection 64(2) of the Act:
 - if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

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