

File No: PLC/33

Date: 16 September 1996

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION
AND ASSESSMENT SCHEME**

FULL PUBLIC REPORT

ALMACRYL P501

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 Worksafe Australia which also conducts the occupational health & safety assessment. The assessment of environmental hazard is conducted by the Commonwealth Environment Protection Agency and the assessment of public health is conducted by the Department of Health and Family Services.

For the purposes of subsection 78(1) of the Act, copies of this full public report may be inspected by the public at the Library, Worksafe Australia, 92-94 Parramatta Road, Camperdown NSW 2050, between the hours of 10.00 a.m. and 12.00 noon and 2.00 p.m. and 4.00 p.m. each week day except on public holidays.

Under subsection 34(2) of the Act the Director of Chemicals Notification and Assessment is to publish this Report in the Chemical Gazette on .

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Acting Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT**ALMACRYL P501****1. APPLICANT**

Agfa-Gevaert Ltd of 372 Whitehorse Road NUNAWADING VIC 3131 has submitted a polymer of low concern notification statement in support of their application for an assessment certificate for ALMACRYL P501.

2. IDENTITY OF THE POLYMER

Based on the nature of the chemical and the data provided, ALMACRYL P501, is not considered to be hazardous. Therefore, the exact chemical identity has been exempted from publication in the Full Public Report.

Trade name: ALMACRYL P501

Method of Detection and Determination: the polymer can be separated by gas chromatography and identified by mass spectroscopy

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa: yellow powder

Melting Point: 100°C

Density: 1200 kg/m³ at 20°C

Water Solubility: 1.4% (gravitational evaluation)

Hydrolysis as a Function of pH: not determined

Flammability Limits: > 200°C

Autoignition Temperature: > 400°C

Explosive Properties: dust explosion possible

Decomposition Temperature: not determined

Reactivity: reacts with strong oxidising agents

Particle Size Distribution: > 70 µm

Comments on Physico-Chemical Properties

The company has provided a result for "watersoluble fraction" as % weight with no further test details (see above). This seems very high as there are no functional groups likely to confer solubility and would appear to reflect soluble low molecular weight impurities.

The notifier has stated that under normal conditions of use the polymer is not expected to break down by hydrolysis, thermal degradation, photodegradation or depolymerisation. While the polymer contains ester groups, hydrolysis is unlikely in the environmental pH range.

The polymer does not contain any reactive functional groups which would be expected to undergo further reaction.

The data provided are acceptable for a polymer of low concern.

4. PURITY OF THE CHEMICAL

Maximum Weight-Percentage of Residual Monomers: < 0.01%

5. INDUSTRIAL USE, FORMULATION AND VOLUME

The notified polymer is used as an ingredient in dry electrophotographic colour developers and toners in the printing industry. It will be imported as a component (at a level of 1-5%) of a developer and (at a level of 80-100%) of a toner at a rate of 1 tonne per year for the first five years.

The developers in plastic bottles and toner cartridges will be imported packed in fibreboard cartons.

6. OCCUPATIONAL EXPOSURE

From the wharf the product containing the notified polymer will be transported by road for distribution, to up to seven sites, in its original packaging for storage and use. Up to 12 workers would be involved in the process.

During printing, a technician will empty four bottles of developer powder (containing metallic developer/carrier and small portion of the toner with 40 g of the notified polymer) into separate reservoirs of the printer. Four cartridges containing toner powder are also loaded separately to the printer. The cartridges remain closed during loading and is opened automatically by a valvular mechanism

during operation. Depending on the work volume in each facility, toner may be replenished every 6 to 8 weeks and developer after a longer period for the same usage. The developer when exhausted (largely depleted of the polymer) is drained from the printing unit into a container for disposal by a technician. Toner cartridge which contains a self sealing valve on exhaustion is removed and disposed. A maximum of 15 technicians will be exposed to the notified polymer during loading and unloading of developer and toner cartridge.

7. PUBLIC EXPOSURE

Almost all of the polymer imported will reach the public as a component of printed matter, bonded to the paper and therefore not bioavailable. The printing process being an enclosed system with minimal release to the atmosphere, and the loading and removal of cartridges of toner or developer being both infrequent and unlikely to give rise to significant quantities of the notified polymer in the wider environment.

8. ENVIRONMENTAL EXPOSURE

Release

Release to the environment during transport and handling would occur only during the unlikely event of an accident. As the notified chemical is being contained in very small containers, large spills in such an accident would be highly unlikely.

During the printing operation, four bottles of developer powder are emptied into the separate reservoirs of the printing machine. Each bottle contains approximately 40 g of the notified polymer. Four toner cartridges containing different colours are also loaded into the printing machine, each of which contains 720 g to 800 g of the notified polymer. Depending on the volume of work, the toner cartridges will need replacing every 6 to 8 weeks, and the developing powder even longer.

When the developer requires replacing, a technician will remove it into a container for disposal. The developer powder at this stage will be depleted of the notified polymer. Once toner cartridges are consumed through bonding to the paper, a valve automatically closes preventing the release of any residual polymer. The cartridge is then replaced by a technician.

Release of the notified chemical will also occur through the disposal of the bottles containing residuals of the toner. It is expected that approximately 1 - 2 g will remain as a residual in the toner cartridge. This would amount to less than 0.25% of the import quantity. Release in this fashion would be minimal and diffuse.

Fate

The notified chemical will most likely share the fate of its paper substrate, and be disposed of to landfill, incinerated or recycled. Small quantities, as residual toner in empty containers, will also be disposed of by landfill. Polymer disposed of to landfill is unlikely to leach or contaminate surface or ground water because of its low water solubility.

Incineration of paper and combustion of the notified chemical in the presence of excess air will result in products of oxides of carbon and water.

Paper recycling is a growing industry in Australia. Wastepaper is repulped using a variety of alkalis, dispersing agents, wetting agents, water emulsifiable organic solvents and bleaching agents. These chemicals enhance fibre separation, ink detachment from the fibres, pulp brightness and whiteness of the paper. After pulping, the contaminants and the ink are separated from the fibres by pumping the stock through various heat washing, screening, cleaning, flotation and dispersion stages.

The notifier has provided no data on the likely behaviour of the notified chemical during the recycling process. The chemical is likely to survive the above conditions, either remaining bound to the pulp or becoming associated with the sludge. In the latter case, the chemical will either arrive in landfill or be disposed of with sludge by incineration.

9. ASSESSMENT OF ENVIRONMENTAL EFFECTS

No ecotoxicological data were provided which is acceptable for polymers of low concern with a number-average molecular weight (NAMW) > 1000 according to the Act. Bioaccumulation of the polymer is not expected as its large molecular size is likely to inhibit membrane permeability and prevent uptake during exposure (1,2).

10. ASSESSMENT OF ENVIRONMENTAL HAZARD

Environmental exposure to the notified substance could occur when paper containing the chemical is recycled or disposed of. In each case, the final destination is likely to be landfill where the polymer can be expected to persist but remain immobile, being either bound to paper or in the sludge from the recycling process.

Accidental spillage of the polymer should result in negligible hazard as it will be marketed in small plastic bottles for direct insertion into photocopier machines.

The low environmental exposure of the notified chemical as a result of normal use indicates that the overall environmental hazard should be negligible.

11. ASSESSMENT OF OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY EFFECTS

Amacryl P501 has been notified as a synthetic polymer of low concern under section 23 for the purpose of section 24A of the Act. The polymer meets the criteria for a synthetic polymer of low concern specified in regulation 4A of the Act and therefore is considered of low hazard to human health.

No toxicology data were submitted for the notified polymer.

Exposure of workers to the notified polymer during wharf handling, transportation and storage up to seven sites is unlikely except in the event of an accident. During normal use of the product containing the notified polymer, evolution of dust is unlikely, unless in the event of accidental spillage. Spillages should be cleaned up promptly to reduce dust cloud formation leading to dust explosion.

According to the Material Safety Data Sheet (MSDS) there is no evidence of adverse effects from the notified polymer in relation to ingestion, skin contact or skin ingestion. It states that the notified polymer “may cause slight eye irritation” and “inhalation of fine powder may irritate the throat and cause coughing” and in the event of exposure first aid procedures should be followed.

There is negligible potential for public exposure to Almacryl P501 arising from the photographic printing process. There may be widespread public contact with the notified polymer on the surface of printed paper, but its adhesion to the surface and physico-chemical properties will be sufficient to preclude absorption across the skin or other biological membranes.

12. RECOMMENDATIONS

To minimise occupational exposure to the notified polymer in the toner and developer the following guidelines and precautions should be observed:

- If engineering controls and work practices are insufficient to reduce exposure to a safe level, then personal protective equipment which conform to Australian Standards (AS) or Australian/New Zealand Standards (AS/NZS) should be worn;

Safety goggles should be selected and fitted in accordance with AS 1336 (3) to comply with AS/NZS 1337 (4),

Impermeable gloves or mittens conform to AS 2161 (5) ,

Industrial clothing must conform to the specifications detailed in AS 2919 (6),

All occupational footwear should conform to AS/NZS 2210 (7) also should be worn;

- Good work practices should be implemented to avoid spillages;
- Good housekeeping and maintenance should be practised. Spillages should be cleaned up promptly and then be put into containers for disposal in accordance with Local or State government regulations;
- Good personal hygiene should be observed; and
- Copies of the MSDS should be easily accessible to employees.

13. MATERIAL SAFETY DATA SHEET

The attached MSDS for Almacryl P501, Chromapress CP Toner Yellow CB6001 (product) and Chromapress CP Developer Yellow D6051 were provided in accordance with the *National Code of Practice for the Preparation of Material Safety Data Sheets* (8).

These MSDS were provided by the applicant as part of the notification statement. The accuracy of this information remains the responsibility of the applicant.

14. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the Act, secondary notification of Almacryl P501 shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

15. REFERENCES

1. Anliker, R., P. Moser and D. Poppinger. 1988. *Bioaccumulation of dyestuffs and organic pigments in fish*. Relationships to hydrophobicity and steric factors. *Chemosphere* 17(8):1631-1644.
2. Gobas, F.A.P.C. A. Opperhuizen and O. Hutzinger. 1986. *Bioconcentration of hydrophobic chemicals in fish: relationship with membrane permeation*. *Environmental Toxicology and Chemistry*, 5:637-646
3. Standards Australia, 1994, *Australian Standard 1336-1994, Recommended Practices for Eye Protection in the Industrial Environment*, Standards Association of Australia Publ., Sydney, Australia.
4. Standards Australia/Standard New Zealand 1992, *Australia/New Zealand Standard 1337-1992, Eye Protectors for Industrial Applications*, Standards Association of Australia Publ., Sydney, Standards Association of New Zealand Publ, Wellington.

5. Standards Australia, 1978, *Australian Standard 2161-1978, Industrial Safety Gloves and Mittens (excluding Electrical and Medical Gloves)*, Standards Association of Australia Publ., Sydney, Australia.
6. Standards Australia, 1987, *Australian Standard 2919 - 1987 Industrial Clothing*, Standards Association of Australia Publ., Sydney, Australia.
7. Standards Australia/Standards New Zealand 1994, *Australian/New Zealand Standard 2210-1994, Occupational Protective Footwear*, Standards Association of Australia Publ., Sydney, Standards Association of New Zealand Publ, Wellington.
8. National Occupational Health and Safety Commission 1994, *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC:2011(1994)], Australian Government Publishing Service, Canberra.