

File No: NA/248

Date: 19 October 1995

**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

**HRJ-11441**

This Assessment has been compiled in accordance with the provisions of *the Industrial Chemicals (Notification and Assessment) Act 1989*, 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 Department of the Environment, Sport, and Territories and the assessment of public health is conducted by the Department of Human Services and Health.

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.

For Enquiries please contact the Administration Coordinator at:

*Street Address:* 92 Parramatta Rd Camperdown, NSW 2050, AUSTRALIA

*Postal Address:* GPO Box 58, Sydney 2001, AUSTRALIA

*Telephone:* (61) (02) 565-9466 **FAX (61) (02) 565-9465**

Director  
Chemicals Notification and Assessment

**FULL PUBLIC REPORT****HRJ-11441****1. APPLICANT**

Agfa-Gevaert Ltd of 372 Whitehorse Road, Nunawading, Victoria 3131 has submitted a limited notification for the assessment of HRJ-11441.

**2. IDENTITY OF THE CHEMICAL**

Based on the nature of the chemical and the data provided, HRJ-11441, is considered to be non-hazardous. Therefore, the chemical identity, spectral data, and composition have been exempted from publication in the Full Public Report and the Summary Report.

**Trade name:** HRJ-11441

**Method of detection and determination:**

The polymer can be separated by gel permeation chromatography and identified by infrared spectroscopy

**3. PHYSICAL AND CHEMICAL PROPERTIES**

The following data refers to the notified polymer and not to the product containing it.

<b>Appearance at 20°C and 101.3 kPa:</b>	Yellow to brown granular solid
<b>Melting Point:</b>	108-115°C
<b>Density:</b>	Not available
<b>Vapour Pressure:</b>	Not available
<b>Water Solubility:</b>	Highly insoluble. (99.998% of the resin recovered by filtration after agitation for 8.5 h in water at RT)
<b>Partition Coefficient (n-octanol/water) log <math>P_{ow}</math>:</b>	Not applicable
<b>Hydrolysis as a function of pH</b>	Not performed. Though ester linkages are present, the polymer contains no functionalities that are likely to hydrolyse under environmental conditions.
<b>Adsorption/Desorption:</b>	Not available

**Dissociation Constant**

pKa: Not performed. Polymer may contain some free carboxylic acid groups expected to have typical acidity.

**Flash Point:** > 93.3°C

**Flammability Limits:** Not flammable

**Autoignition Temperature:** Not applicable

**Decomposition Products:** May release CO, CO<sub>2</sub> and H<sub>2</sub>O

**Explosive Properties:** Not explosive

**Reactivity/Stability:** Avoid strong oxidants

**Particle size distribution:** range 50-2000 µm (range)

**Comments on Physico-Chemical Properties**

No data were given for the hydrolysis, partitioning coefficient, adsorption/desorption and dissociation constant due to the insoluble nature of the polymer. This is acceptable. On the basis of its low water solubility, the polymer is likely to adsorb to soil/sediment and organic matter or be immobile in soil. Measurement of partition coefficient would be difficult.

**4. PURITY OF THE CHEMICAL**

**Degree of purity :** 98-100%

**Toxic or hazardous impurity/impurities:** None known

**Non-hazardous impurity/impurities:** (> 1% by weight) None known

**5. INDUSTRIAL USE**

HRJ-1441 is a branched, partially crosslinked polyester resin, which is to be used as an ingredient in dry electrophotographic colour developers and toners for low energy, hot roll fusing applications. The notified polymer will be imported at quantities of > 1 tonne/annum in the first year, rising to > 5 tonnes in the next four years.

**6. OCCUPATIONAL EXPOSURE**

HRJ-1141 will not be manufactured in Australia. The notified polymer will be imported as an ingredient of a powder toner/developer in 1.7 kg sealed cartridges, packed in fibreboard cartons. The developer (with a small percentage of the polymer) comes in screw capped, 1.7 kg plastic bottles and the toner (with a high percentage of the polymer) comes in cartridges weighing approximately 450g. To prepare the printing machine for a run four bottles of developer containing about 160g of the polymer and four toner cartridges containing 1.6-1.7 kg of the polymer are used. The developer and toner contain 1-5% and 80-100% of the notified polymer respectively.

Workers likely to be exposed to HRJ-1141 are:

transport and storage workers involved in conveying the notified chemical to the storage sites. Approximately 45 transport and storage workers will be involved in these tasks in Australia.

. printing workers involved in loading sealed toner cartridges into the reservoirs of the printing engine. Approximately 80 printing workers will be involved in carrying out this task every 2 to 4 weeks.

. workers involved in removing the toner cartridge and placing in a waste container for disposal. Approximately 40 workers will be involved in this task.

The exact number and categories of workers exposed to the product containing the chemical in Australia will depend on the number of machines used and the amount of printing carried out on each machine. The product containing the chemical is contained in a sealed cartridge thus minimising direct contact with the notified chemical.

## **7. PUBLIC EXPOSURE**

The toner/developer containing the notified chemical will be used in the printing industry for producing full colour documents in short production runs, and not intended for domestic use. The notified chemical may be released into the atmosphere when the developers are loaded into printer engine reservoirs from the containers. However, the release will be minimal because the developers contain only 1-5% of the notified chemical and emptying developers into the printer engine reservoirs occur infrequently, and is of short duration. The toner cartridges remain closed during loading. During printing, the enclosed cartridges are opened by a valve only when the printing unit is operating. There should be minimal release of the toner to the atmosphere during printing. Thus, public exposure to the notified chemical will be minimal during its use.

The public may be in contact with the notified chemical by handling the printed paper. The notified chemical, however, is tightly bonded onto the paper, and the exposure is expected to be negligible.

The printed paper and the empty cartridges with a small amount of residues may be disposed of to landfill sites. As the water solubility of the notified chemical is very low, it is expected that the notified chemical is to remain immobile at landfill sites. Therefore, contamination of ground water is unlikely to occur.

In the case of accidental spillage during transport, public exposure will be minimal because the notified chemical is insoluble in water and the spills are easily contained and cleaned up by the recommended practices as outlined in the MSDS.

## **8. ENVIRONMENTAL EXPOSURE**

### **. Release**

In preparing the printing unit for a run the technician will empty 4 bottles of developer containing a small amount of the notified polymer into reservoirs. Four toner cartridges containing a total of about 1.7 kg of the polymer will also be loaded to the machine. During printing, the polymer in the toner component of the developer gets deposited onto the paper. As the developer gets depleted of toner it is automatically replenished from the toner cartridge whilst the printer is in operation. Toner cartridges will be replaced every 3-5 weeks depending on the amount of printing. When the cartridge is empty, the

exit valve on the cartridge closes automatically preventing release of any residual powder. The technician then replaces it with a new cartridge. The replacement of the developer will be done only over long periods. The technician removes the used developer that is depleted of the new polymer, into a container for disposal and adds fresh developer. Therefore the release of the notified polymer under normal conditions of use is expected to be negligible.

Release to the environment as a result of accidents (during transport or in the workplace) is expected to be negligible.

The toner cartridge, the used developer and any spills can be disposed of as domestic waste, according to government regulations (eg landfill, incineration).

Since most of the notified chemical gets bonded to the paper during printing, release to the environment may occur through processing of waste paper. This possibility is explored further below.

#### . **Fate**

Disposal of the notified polymer to landfill is unlikely to result in contamination of surface and ground waters. Its low water solubility indicates that it is unlikely to leach. Residual monomers are 0.5% or less in weight.

Combustion of the notified polymer in the presence of excess air will result in products of oxides of carbon and water.

Unless incinerated, the polymer is likely to arrive in a dispersed manner in landfill bound to waste paper. As such, it will be immobile, and no leaching from landfill would be expected despite the polymers expected persistence.

The toner that binds to the paper during printing has a high concentration of the polymer. When recycled, waste paper is repulped using a variety of alkalis, dispersing agents, wetting agents, water emulsifiable organic solvents and bleaching agents. These chemicals enhance the fibre separation, ink detachment from the fibres, pulp brightness and the 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 polymer during the recycling process. The hydrolysis of ester linkages under alkaline conditions may be minimal due to the very low solubility of the polymer. The polymer therefore is likely to survive the paper recycling conditions, either remaining bound to the pulp or becoming associated with the sludge. In the latter case, the polymer will arrive in landfill where it can be expected to remain intact, or be destroyed through incineration.

## **9. EVALUATION OF TOXICOLOGICAL DATA**

Toxicology data are not required for polymers of number-average molecular weight (NAMW) > 1000 according to the *Industrial Chemicals (Notification and Assessment) Act, 1989* and no data were submitted for the notified polymer.

## **10. ASSESSMENT OF ENVIRONMENTAL EFFECTS**

No toxicological data were provided, which is acceptable for polymers of NAMW>1000 according to the *Act*.

The notified polymer is not likely to exhibit toxic characteristics in the environment because large polymers of this nature are not readily absorbed by biota.

## **11. ASSESSMENT OF ENVIRONMENTAL HAZARD**

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

Environmental exposure to the notified substance could occur when paper containing the polymer 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 to the sludge from the recycling process.

Accidental spillage of the polymer should result in negligible hazard as most of it will be marketed in cartridges for direct insertion into the printing machines.

## **12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS**

The notified polymer is not expected to be a health hazard as the high NAMW (>1000) should preclude transmission of molecules across biological membranes and cause systemic toxicity.

Occupational exposure to the notified polymer is expected to be minimal, since, it is imported in robust electrographic colour developer and toner cartridges and no repackaging occurs. The only significant occupational exposure expected is when the plastic seals are removed to empty the contents of the cartridges to the reservoirs of the printing engine. However, as this occurs infrequently (every 2 to 4 weeks), is of short duration, minimal quantity of the developer and the toner is expected to be released to the atmosphere.

Safe work practices will minimise spillage and dust cloud formation during transport, storage and use of the chemical. Ignition sources should be avoided. This is minimised by the recommended practices for storage and transportation.

The risk of adverse occupational health or safety effects resulting from transport, storage, use or disposal of the notified polymer is expected to be minimal.

## **13. RECOMMENDATIONS**

To minimise occupational exposure to HRJ-11441 the following guidelines and precautions should be observed:

- . when emptying toner and developer cartridge containing the notified polymer, care should be taken to avoid exposure to the toner adhering to the plastic tape. Should

exposure occur, the toner or developer should be removed immediately by washing.

- . in the event of an accidental spill, effective decontamination, vacuuming dust and cleaning of contaminated walls and surfaces must be carried out.
- . if conditions of use of the notified polymer are varied, greater exposure may occur. In such circumstances, further information may be required to assess the hazards to public health.
- . copies of the Material Safety Data Sheets (MSDS) should be easily accessible to employees.

#### **14. MATERIAL SAFETY DATA SHEET**

The attached MSDSs for the product containing HRj-11441 were provided in a suitable format ( 1).

These MSDSs were provided by Agfa-Gevaert Limited as part of their notification statement. It is reproduced here as a matter of public record. The accuracy of this information remains the responsibility of Agfa-Gevaert Limited.

#### **15. REQUIREMENTS FOR SECONDARY NOTIFICATION**

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of HRJ-11441 shall be required if any of the circumstances stipulated under subsection 64(2) of the Act arise. No other specific conditions are prescribed.

#### **16. REFERENCES**

1. National Occupational Health and Safety Commission, 1990. , *Guidance Note for the Completion of a Material Safety Data Sheet*, 2nd. edition, AGPS, Canberra , Australia.