

HEALTH & SAFETY INFORMATION

1. IDENTIFICATION

PRO-CLEAN DEVELOPER SYSTEMS CLEANER

Pro-Clean is used for removing silver and gelatin deposits from photographic developer rollers, tanks and related equipment. It does not contain chromium.

It is packed 6x1litre plus 3x500ml plastic bottles in a cardboard box (Packing Code 4G), comprising 3 bottles each of Part A (500ml), Part B (1 litre) and Neutraliser (1 litre). Normal procedure is to add 1 bottle each of Part A and B to the washed-out developer tank (half-filled with water), circulate for 15 minutes, wash-out thoroughly, refill with water, add 1 bottle of Neutraliser, recirculate 5 minutes, drain and refill with developer. Dilution will vary with tank volume - the more concentrated the solution the less time to clean - but for a typical 10 litre tank it is 1+9 for Part B and Neutraliser, and 1+19 for Part A.

The product is manufactured by Photosol at the above address.

In emergency, telephone +44 (0)1277 235456 in business hours.

2. COMPOSITION

Only Part A contains components defined as hazardous to health in the Control of Substances Hazardous to Health (COSHH) Regulations, i.e. appear in the Chemicals (Hazard Information & Packaging) (CHIP) Regulations and/or which have a maximum exposure limit or occupational exposure standard in the HSE document EH40. These regulations are themselves based on EC Directives of which 88/379/EEC and 67/548/EEC are particularly relevant.

Component	CAS no.	%w/w	Symbol	Risk Phrases
Part A Water		80		
Nitric acid	7697-37-2	30	C	35

3. HAZARDS

The concentration of nitric acid in Part A causes severe burns to all parts of the body. It will attack most metals to liberate flammable hydrogen gas and some plastics (but not stainless steel or glass). It has a pungent odour which may irritate the respiratory tract. Prolonged contact with Part B may cause defatting and dermatitis while ingestion may cause irritation, nausea, vomiting, and kidney damage.

4. FIRST AID

- Eye Contact:** Immediately irrigate the eyes copiously with water for 10 minutes and seek medical advice urgently.
- Skin Contact:** Drench the skin with copious amounts of water and wash with soap and water. Remove contaminated clothing and wash before re-use. Seek medical advice if irritation persists.
- Ingestion:** Wash out mouth with water and give 500mls of milk to drink (or water if milk is not available) and send urgently to hospital. Do not induce vomiting unless only Part B has been swallowed, and never give anything by mouth to an unconscious person.
- Inhalation:** Remove the person to fresh air. If irritation or breathing difficulties persist, seek medical advice.

5. FIRE FIGHTING

The solutions are water-based and non-combustible. There is no explosion hazard. Combustion products comprise oxides of nitrogen and carbon, and inorganic particulates.

6. ACCIDENTAL RELEASE

- Personal:** Wear personal protective clothing as Section 8.
- Environmental:** Avoid release to natural water and surface water drains if possible. However, the environment is well buffered and so disposal to natural water is unlikely to cause significant harm provided the quantities involved are relatively small. Heavy dilution with water will render any spillage relatively harmless to the environment.
- Cleaning:** Preferably contain the solutions and absorb on sand, earth or inert proprietary materials. Part A can be made less hazardous by greatly diluting with water and then neutralising the acid with lime or washing soda (sodium carbonate); the absorbed liquid should be placed in a secure non-metallic container and disposed of via waste contractor. Small quantities of the solutions can be flushed to soil drain with copious amounts of water, relying on subsequent further dilution in the drainage system to render them harmless.

7. HANDLING & STORAGE

Good general ventilation of ten or more room volume changes per hour in the work area is recommended. Storage should be at moderate temperature i.e. 5-20°C. Keep away from strong alkalis and easily oxidisable material and out of direct sunlight. Use stainless steel, glass, plastic or earthenware containers.

8. PERSONAL PROTECTION

In the event of spillage, or when working in close proximity to the solution (e.g., processor maintenance and cleaning), wear protective clothing. This should comprise an overall, nitrile or natural rubber gloves, safety goggles or visor to BS EN 166-3S, and a half-mask respirator fitted with an E1 filter which protects against acid gases. Use an ABEK1 filter for all-round protection where other processing fumes are present. Note that nitrile gloves have a 'useful time' of exposure to nitric acid (as in Part A) after which they should be replaced, e.g. 10-30 minutes for Marigold Blue Nitrile gloves. Natural rubber is more resistant than nitrile rubber to nitric acid, but natural rubber can cause allergic reactions and is less resistant than nitrile to other X-ray processing chemicals.

9. PHYSICAL & CHEMICAL PROPERTIES

	Part A	Part B	Neutraliser
<i>Solution appearance</i>	colourless	purple	colourless
<i>Odour</i>	pungent	none	none
<i>pH</i>	< 0.1	8.0	2.0
<i>Boiling point</i>	>100°C	>100°C	>100°C
<i>Melting point</i>	none	none	none
<i>Flash point</i>	none	none	none
<i>Explosive properties</i>	none	none	none
<i>Oxidising properties</i>	strong	strong	none
<i>Vapour pressure</i>	not determined	not determined	not determined
<i>Specific gravity</i>	1.18	1.02	1.04
<i>Water solubility</i>	complete	complete	complete
<i>Octanol/water partition</i>	not determined	not determined	not determined

10. STABILITY & REACTIVITY

All solutions are stable and will not polymerise. Part A is a strongly acidic oxidising solution and will react vigorously with alkalis and reducing agents (including photographic developers), corrode most metals and may liberate sulphur dioxide and carbon dioxide in contact with other photographic solutions. Part B is strongly oxidising and will react vigorously with reducing agents. Part C is mildly acidic and will react vigorously with alkalis.

11. TOXICOLOGICAL

The table summarises data for the significant component identified in Section 2.

	Oral-rat TDLo	Occupational Exposure Standard*
Nitric acid	2345mg/kg	2 ppmv (5.2mg/M ³)
*	- the lowest applicable (long-term)	
mg	- milligram	
M ³	- cubic metre ppmv – parts per million by volume	
kg	- kilogram	
TDLo	- lowest published toxic concentration	

12. ECOLOGICAL

Background

Freshwater ecotoxicity is assessed from the effects of the substance on fish (typically rainbow trout for cold water and bluegill sunfish for warm), invertebrates (Daphnia or waterflea) and algae (especially *Selenastrum capricornutum*). The effects are expressed as 96hrLC₅₀, 48hrEC₅₀ and 72hrIC₅₀ values respectively (L=lethal, E=effect, I=inhibition – referring to C=concentration at which there is 50% inhibition of growth or 50% of the organisms are affected or dead after the specified interval). Units are usually milligrams per litre and any value of 100mg/l or less indicates a toxic substance.

Toxic effects are lessened if the substance degrades rapidly. Biodegradability is considered rapid if the ratio BOD₅/COD is >0.5. (BOD₅ is the biological oxygen demand imposed by the substance on natural water as it degrades over 5 days. COD is the chemical oxygen demand during complete laboratory oxidation with dichromate. High BOD or COD means a polluting substance likely to kill organisms by depleting oxygen). Rapid degradation is also assumed if 70% of dissolved organic carbon (DOC) disappears, or if 60% of the theoretical maximum oxygen depletion (OD) or carbon dioxide generation (COG) is achieved, over a 28 day period. Abiotic degradation is also possible, e.g. photolysis.

Toxic effects are accentuated if organisms accumulate the contaminant through either the food chain or absorption from ambient media like water. Bioaccumulation potential is related to the partition of the substance between water and lipids. A useful indicator is the octanol/water partition coefficient expressed as its logarithm (logPow). If logPow ≥3.0 the substance is considered bioaccumulative unless the measured bioconcentration factor (BCF) is ≤100. (The BCF is the ratio of the concentration inside the organism compared to that in the ambient environment).

Data

There is no constituent with ecotoxicity ≤100mg/l but used solutions will contain ecotoxic silver ions:

		Environmental Pollutant
		<u>silver ion</u>
toxicity (mg/l)	- LC ₅₀ (fish)	4.8µg/l
	- EC ₅₀ (Daphnia)	0.6µg/l
	- IC ₅₀ (algae)	9.3µg/l
	- interpretation	very toxic
degradability	- BOD ₅ /COD	does not degrade
	- DOC	n/a
	- OD/COG	n/a
	- abiotic	does not degrade
- interpretation	persists	
bioaccumulation	- logPow	neg.
	- BCF	no data
	- interpretation	low

Because Parts A and B are oxidants they cannot be assigned meaningful theoretical Chemical Oxygen Demands (COD). The Neutraliser has a COD of 92,000mg/l.

Comment

The product cleans by dissolving metallic silver and consequently the used solution will contain silver. Soluble silver is toxic to aquatic life but in the environment it is ultimately deposited in sediment.

Nitric acid is not environmentally dangerous. It appears toxic from tables, but this is derived from its pH effect rather than inherent toxicity. This effect is swamped in the environment by dilution and natural buffering.

13. *DISPOSAL*

Small amounts of Pro-Clean, as would arise from the cleaning of photographic processing equipment, can normally be disposed to foul sewer as trade effluent. Disposal in this manner should be disclosed to the local Water Company as part of any application for a trade effluent consent.

Larger amounts should be disposed of via a licensed waste contractor. All solutions are classified 'special waste' except unused Part B, and unused and used Neutraliser.

Contaminated containers should be washed free of the product to enable them to be disposed of as normal 'Controlled Waste' or recycled. Provided the washings are small, dispose to drain with copious quantities of water.

14. *TRANSPORT*

The volume of hazardous Part A solution is sufficiently small for the product to be classified for surface transport as 'Dangerous Goods in Limited Quantities of Class 8'. The UN number where required is 2031.

The product is forbidden in passenger aircraft and is not packaged satisfactorily for transport by cargo aircraft where it is classified UN2031 NITRIC ACID; CLASS 8; PACKING GROUP II.

15. *REGULATORY INFORMATION*

Labelling is in accordance with the Code of Practice for Classification, Packaging and Labelling of Photographic and Lithographic Processing Chemicals (European Photochemical Industry, Sector Group of CEFIC) which complies with but extends the regulations listed in Section 2 above. Only Pro-Clean Part A and the outer carton require hazardous labelling.

Symbol	Dangerous Substance	Risk Phrases	Safety Phrases
C	Nitric Acid, 30%	35	23-26-36-45

16. *OTHER INFORMATION*

Relevant risk and safety phrases are as follows:

Risk	- 35	Causes severe burns.
Safety	- 23	Do not breathe vapour.
	- 26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	- 36	Wear suitable protective clothing.
	- 45	In case of accident or if you feel unwell, seek medical advice immediately (show label where possible).

The symbol 'C' means 'corrosive'.