

SAFETY DATA SHEET

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1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

Official Name: **PIES AUTOMATIC X-RAY FIXER**

Aqueous solution of a dental fixer at working strength for immediate use in automatic processors.
The products is packed as 2x5 litre plastic bottles in a cardboard box.

Catalogue Number(s): To make 2x5 litres

Processing Imaging Equipment Services Unit17G Brookes Mill, Armitage Bridge,
Huddersfield HD4 7NR Tel: 01484 665333

2. COMPOSITION/INFORMATION ON INGREDIENTS

Major components are as follows. These include those defined as hazardous to health in the Control of Substances Hazardous to Health Regulations, i.e. appear in the Chemical (Hazard Information &Packaging) (CHIP) Regulations &/o which have a maximum exposure limit or occupational exposure standard in the Health & Safety Executive document EH40. These regulations are themselves based on EC Directives of which 88/379/EEC, 67/548/EEC & 91/325/EEC are particularly relevant.

Component	CAS Registry No.	EINECS Number	% w/w	Symbol	Risk Phrases
Water	007732-18-5	231-791-2	70-80	-	-
Ammonium thiosulphate	7783-18-8	231-982-0	10-15	-	-
Sodium metabisulfite	7681-57-4	231-673-0	1,2-1,8	Xi	R31-36/37
Aluminium sulphate	7784-31-8	233-135-0	<1	-	-
Acetic acid	64-19-7	200-580-7	<2	C	R34

None of these components are present at concentrations high enough to be regarded as dangerous under the above regulations.

3. HAZARDS IDENTIFICATION

Contact with eyes or skin may cause irritation because of the mildly acidic nature of the solutions. It is also mildly toxic by ingestion. Sulphur dioxide and acetic acid fumes are emitted slowly from the solution and inhalation may irritate the upper respiratory tract. A person suffering from asthma may be affected by sulphur dioxide at concentrations as low as 200 ppb

The solution is largely water and contains no major pollutants.

4. FIRST-AID MEASURES

- **Eye contact:** irrigate the eyes with water for 15 minutes. Ensure all traces are washed out. Seek medical advice.
 - **Skin contact:** wash affected areas with soap and water as soon as possible.
 - **Ingestion:** wash mouth and throat abundantly with water. Seek medical advice.
 - **Inhalation:** remove the person to fresh air.
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5. FIRE-FIGHTING MEASURES

The solution is water-based and non-combustible. There is no explosion hazard.

6. ACCIDENTAL RELEASE MEASURES

- **Personal:** prevent skin and eye contact. Use respiratory and other protection as Section 8.

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- **Environmental:** in emergency the solution can be safely disposed to foul sewer by dilution with water (see Section 12).
 - **Cleaning:** excess liquid should be absorbed with sawdust, sand or proprietary methods. Dispose of this material via incineration or waste contractor.
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7. HANDLING AND 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 acids and alkalis.

8. PERSONAL PROTECTION

In the event of spillage, or when working in close proximity to the solutions (e.g. processor maintenance or cleaning), wear protective clothing. This should comprise an overall, rubber goggles to BS2092C and a respirator. A half-mask respirator is satisfactory fitted with an ABEK1 filter which protects against all fumes likely to be encountered in processing areas including acid gases (such as acetic acid and sulphur dioxide), and ammonia (which may be released if developer and fixer mix).

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear, yellowish liquid
Odour	Slight vinegary
pH	4,30-4,40
Boiling point	>100°C
Melting point	< 0°C
Flash point	none
Explosive properties	none
Oxidising properties	none
Vapour pressure	Not determined
Specific gravity (water =1)	1,080-1,090
Water solubility	complete
Octanol/water partition	Not determined

10. STABILITY AND REACTIVITY

The solution is stable and will not polymerise. It is predominantly water. With strong alkalis it will react vigorously to liberate ammonia, with strong acids it will liberate sulphur dioxide; both are pungent, toxic gases. Thermal decomposition will yield nitrogen, carbon dioxide and inorganic particulates.

11. TOXICOLOGICAL INFORMATION

The table summarises data for the hazardous components identified in Section 2.

	Oral-rat LD₅₀	Occupational Exposure standard*
Ammonium thiosulphate	2890 mg/kg	-
Acetic acid	3310 mg/kg	10 ppmv
Sulphur dioxide	2520 ppm/ph (LC ₅₀)	2 ppmv

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Ammonia	350 mg/kg	25 ppmv
Aluminium sulphate	-	2 mg/m ³ (as aluminium)

mg = milligram

kg = kilogram

m³ = cubic metre

*the lowest applicable (usually long-term)

ppmv = parts per million by volume

LD₅₀ = calculated dose to kill 50% of a population of rats when taken in food or drink

LC₅₀ = calculated airborne concentration to kill 50% of a population of rats.

Acetic acid makes the solution mildly acidic and it may cause skin and eye irritation through contact with the solution or the vapour. Sulphur dioxide will irritate the mucous and upper respiratory tract, and can affect asthmatics at concentrations as low as 200 ppb. Ammonia is an eye and mucous membrane irritant with systemic effects through inhalation.

12. ECOLOGICAL INFORMATION

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 72 hrIC₅₀ values respectively (L=lethal, E=Effect, I=inhibition-referring to C=concentration at which there is 50% inhibition of growth or 50% of the organism are affected or dead after the specified interval). Units are usually milligrams per litre and any value of 100 mg/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 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 (BFC) is <=100 (the BCF is the ratio of the concentration inside the organism compared to that in the ambient environment).

Data

The table summarises information for constituents with ecotoxicities <= 100 mg/l:

Environmental Pollutant		
		Silver ion
Toxicity (mg/l)	LC ₅₀ (fish)	4,8 µg/l
	EC ₅₀ (Daphnia)	0,6 µg/l
	IC ₅₀ (algae)	9,3 µg/l
	interpretation	Very toxic
Degradability	BOD ₅ /COD	Does not degrade
	DOC	n/a
	OD/COG	n/a

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	Abiotic Interpretation	Does not degrade Persists
Bioaccumulation	LogPow	neg
	BCF	no data
	Interpretation	Absent

The theoretical oxygen demand of the fixer is 112,000 mg/litre.

Comment

Silver is not present in the fresh solution but dissolves from the film during processing. The free silver ion Ag^+ is extremely toxic (LC_{50} values etc are micrograms per litre) but is hardly present in photo effluent because interaction with other ions complexes it or makes it relatively insoluble. The silver thiosulphate complex in fixers, for example, is 15000 times less toxic than Ag^+ . In the environment most silver is precipitated and cannot bioaccumulate. Sewage works remove about 95% of the small amount of metal remaining after in-house silver recovery.

13. DISPOSAL CONSIDERATIONS

Spent fixer will contain silver and should therefore be disposed of via waste contractor or treated to remove the silver before release to foul sewer. Unused solution should be acceptable for direct discharge to sewer provided it is diluted with water. In the case of disposal by waste contractor, both concentrated and diluted fixer is classified "Special Waste" because they release toxic gas (sulphur dioxide) in contact with strong acid, as may accidentally occur in a waste treatment plant. Empty bottles should be rinsed for safety and to facilitate recycling.

14. TRANSPORT INFORMATION

Product classified as not dangerous for transport

15. REGULATORY INFORMATION

The product is insufficiently hazardous to be regarded as dangerous 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.

16. OTHER INFORMATION

The following is an explanation of the meaning of the Symbol letters and Risk Phrases for the pure substance(s) referred to in Section 2 of this Safety Data Sheet.

Xi - Irritant
C- Corrosive

R34: Causes burns
R36/37: Irritating to eyes and respiratory system.
R31: Contact with acids liberates toxic gas

Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees, customers

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and third parties and the protection of the environment. The information relating to the working solution is for guidance purposes only, and is based on correct mixing and use of the product according to instructions.