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NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION AND ASSESSMENT SCHEME

FULL PUBLIC REPORT

SUBSTANCE H112793

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.

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Director
Chemicals Notification and Assessment

FULL PUBLIC REPORT

SUBSTANCE H112793

1. APPLICANT(S)

Canon Australia Pty Ltd of 1 Thomas Holt Dr, North Ryde, Sydney, NSW 2113 and ICI Australia (Operations) Pty Ltd of 1 Nicholson St, Melbourne, Vic 3000 have submitted a standard notification for assessment of SUBSTANCE H112793.

2. IDENTITY OF THE CHEMICAL

Based on the nature of the chemical and the data provided, Substance H112793, is considered to be non-hazardous. Therefore, the chemical name, CAS number, molecular formula, structural formula, molecular weight and spectral data have been exempted from publication in the Full Public Report and the Summary Report.

Other names: Substance H112793
Projet Fast Cyan 2

Trade names: Pro-jet Fast Cyan 2
Pro-jet Fast Cyan 2 Liquid (preparation)

Method of detection and determination:

HPLC separation and infrared spectroscopy.

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance at 20°C and 101.3 kPa:	Blue/red granular powder
Melting Point:	> 300°C
Density:	1620 kg/m^3 at 20°C
Vapour Pressure:	< 4 x 10^{-3} kPa (estimated from 9.4 kPa at 145.9°C)
Water Solubility:	> 320 -340 g/L at 22°C (flask method, exact value uncertain as chemical will gel)
Surface Tension of Aqueous Solution:	73 mN/m at 24°C
Fat Solubility:	< 0.1 mg/Kg at 37°C (in fat stimulant)
Partition Co-efficient (n-octanol/water) log P_{ow}:	-1.5 at 25°C

Hydrolysis as a function of pH:	< 10% at pH 4, 7 and 9 at 50°C.
Adsorption/Desorption:	Test not performed**.**
Dissociation Constant pK_a**:**	Test not performed. The notified chemical is an ammonium/sodium salt which contains aromatic carboxylic and sulfonic acid groups and expected to have dissociation constants typical for these functionalities.
Flammability Limits:	Does not propagate combustion
Autoignition Temperature:	387°C
Explosive Properties:	Non-explosive
Reactivity/Stability:	Non-reactive
Particle size distribution:	Not measured as the substance will only be imported in solution.

Comments on the physico-chemical properties

Tests were performed according to EEC test guidelines and at facilities complying with OECD principles of Good Laboratory Practice.

Adsorption/desorption:

The notifiers comments indicate strong adsorption of the notified chemical may occur. However, the the high solubility, low partition coefficient, and low fat solubility of the notified chemical would tend to indicate low adsorption. Furthermore, during normal use a proportion of the notified chemical will encounter sewage and recycling effluents, the alkaline nature of these systems is likely to result in low sorption of the notified chemical to solids.

4. PURITY OF THE CHEMICAL

Degree of purity: > 95%

5. INDUSTRIAL USE

The notified chemical will be used as a component of a preparation used in ink-jet reprographic processes. It is imported as a 5% aqueous solution in a sealed cartridge at a rate of 1-10 tonnes for the next 5 years. The notified chemical will be used Australia wide, predominantly in the home and small office market.

6. OCCUPATIONAL EXPOSURE

The notified chemical is to be imported in sealed cartridges each containing 55 ml of the black ink formulation. The volume of any single coloured (non black) cartridge will range from 2-15 mL. It is stated that normal handling, involving replacement of the spent ink cartridge by service technicians or office workers will not result in exposure to the ink and such exposure should only result if the cartridge is faulty and ruptures. Under normal conditions of use, < 10 mg of the notified chemical is expected on each printed page.

7. PUBLIC EXPOSURE

Substance H112793 is a component of a preparation used in ink-jet reprographic processes. It is not manufactured or reformulated in Australia, but is imported as a 5% aqueous solution in a liquid ink preparation within a sealed cartridge for use in ink-jet printers. The cartridges contain approximately 50 mL of formulated ink. The estimated import volume is 1 tonne in the first year, increasing to 1-10 tonnes within 5 years. The notifiers have stated that the ink containing the notified substance is not classified as a dangerous good and no special storage or transport requirements are necessary. Cartridges containing the ink will be delivered to consumers by road transport.

The public may potentially come in contact with the notified substance through either handling the ink containing cartridges when replacing spent cartridges in printers, when handling paper printed with the notified substance, or in the case of a ruptured cartridge. However, public exposure is expected to be minimal since the notified substance is contained within a sealed cartridge at a relatively low concentration (5% aqueous solution) and low volume (approximately 50 mL). Further, Substance H112793 becomes insoluble on contact with the surface of the paper.

Virtually all of the Substance H112793 will be released to the environment on printed paper which may be buried in landfills or incinerated. Incineration of the notified substance is likely to produce oxides of carbon, nitrogen and sulphur. Substance H112793 may also be released in trade effluent sewers if printed paper goes through a de-inking process for paper recycling. While the paper may contain several micrograms of the notified substance, the notifier has indicated that the amount of Substance H112793 released through de-inking would be small in comparison with the total load released from such processes. Empty cartridges which may contain residues of the Substance H112793 ink will be disposed of in normal office rubbish.

8. ENVIRONMENTAL EXPOSURE

. Release

Spills that occur during transport or handling will be absorbed onto earth, sand or other suitable absorbent materials, transferred to waste containers and consigned to secure landfill in accordance with the MSDS. The occurrence and size of spills should be minimised due to the small volumes contained in the cartridges and the protection offered by the cartridge housing.

Cartridges will be replaced by the user. Empty cartridges will be disposed with normal office refuse and domestic garbage.

. Fate

During normal use the notified substance will become bound to cellulosic substrates and in this state is not expected to adversely impact on the environment. Although the notified chemical is soluble at the pH of the ink solution (pH 9), it becomes insoluble on contact with paper, a result of the lower pH of the paper.

Environmental exposure will result from the disposal of printed paper and discarded cartridges. In addition to landfill, printed paper may also be recycled after first being subjected to a de-inking process. De-inking wastes are expected to go to trade waste sewers. On combustion oxides of carbon, nitrogen and sulphur will be released.

Ink residues contained in the empty cartridges are expected to remain within the cartridge housing.

The high water solubility of the notified chemical indicates that unbound residues released directly to the aquatic compartment are likely to remain in solution where they will be rapidly diluted.

The ready biodegradability of the notified chemical was assessed using the modified MITI test (OECD TG 301C). Analysis of BOD at the end of the test indicated that no measurable biodegradation had occured. Biochemical and chemical oxygen demand test results (BOD_5 < 0.01 g/l, COD 1.11 g O_2/g) indicate that no significant biodegradation is likely under aerobic conditions . Colorimetric analysis showed negligible colour removal over 28 days, indicating that the chemical may be present.

The bioaccumulation potential of the dye was not investigated. The high molecular weight (>1000), low partition coefficient (log P_{ow} < -1.5) and high water solubility (~320 - 340 g/l) of the notified chemical indicate that significant bioaccumulation is not likely.

9. EVALUATION OF TOXICOLOGICAL DATA

9.1 Acute Toxicity

Table 1 Summary of the acute toxicity of SUBSTANCE H112793

Test	Species	Outcome	Reference
Acute oral toxicity	Rat	LD_{50} > 2000 mg/kg	(1)
Acute dermal toxicity	Rat	LD_{50} > 2000 mg/kg	(3)
Skin Irritation	Rabbit	slight irritant	(4)
Eye irritation	Rabbit	moderate irritant	(6)
Skin sensitisation	Guinea-pig	mild sensitiser	(7)

9.1.1 Oral Toxicity (1)

LD_{50}: > 2000 mg/kg *Species/strain:* Rat - Wistar-derived albino (AlpK:APfSD)

Number/sex of animals: 5M, 5F *Observation period:* 14 days

Method of administration (vehicle): gavage (corn oil)

Clinical observations: no signs of toxicity

Mortality: no deaths *Morphological findings:* no treatment-related findings

Test Method: directive 84/449/EEC (2) Test B1

9.1.2 Dermal Toxicity (3)

LD_{50}: > 2000 mg/kg *Species/strain:* Rat - Wistar-derived albino (AlpK:APfSD)

Number/sex of animals: 5M, 5F *Observation period:* 14 days

Method of administration (vehicle): occlusive dressing (corn oil),

Clinical observations: slight erythema, oedema and scabbing were observed in 3 females, regressed by day 5 but no other significant signs of toxicity

Mortality: no deaths *Morphological findings:* no treatment-related findings

Test Method: directive 84/449/EEC (2) Test B1

9.1.3 Skin Irritation (4)

Result: slight irritant *Species/strain:* New Zealand White rabbits

Number/sex of animals: 3 M

Method of administration: occlusive dressing, 500 mg of chemical in deionised water, 4 hour exposure

Test Method: directive 84/449/EEC (2) Test B1

Draize (5) Scores[i]*:*

Animal	Time after decontamination			
	30-60 min	1 day	2 days	3 days
ERYTHEMA				
1	1	0	0	0
2	1	0	0	0
3	1	1	1	0
OEDEMA				
1	1	1	0	0
2	1	0	0	0
3	1	1	0	0

9.1.5 Eye Irritation (6)

Result: moderate irritant

Species/strain: New Zealand White rabbits *Number of animals:* 3 M

Method of administration: 100 mg of the notified chemical applied into the conjunctival sac of the left eye

Test Method: directive 84/449/EEC (2) Test B1

Draize (5) Scores[ii]

Animal	Time after instillation														
	1 day			2 days			3 days			4 days			7 days		
CORNEA:	opacity area			opaci y t area			opaci y t area			opacity area			opacity area		
1	*	*		*	*		*	*		0	0		0	0	
2	*	*		*	*		*	*		0	0		0	0	
3*	2	2		1	1		1	1		0	0		0	0	
IRIS															
1	0			0			0			0			0		
2	1			1			1			0			0		
3*	1			1			0			0			0		
CONJUNCTIVA	r[a]	c[b]	d[c]	r[a]	c[b]	d[c]	r[a]	c[b]	d[c]	r[a]	c[b]	d[c]	r[a]	c[b]	d[c]
1	2	1	0	1	0	0	1	0	0	1	0	0	0	0	0
2	*	1	2	*	1	0	*	0	0	*	0	0	*	0	0
3*	*	1	3	*	0	0	0	0	0	0	0	0	0	0	0

[a] redness [b] chemosis [c] discharge * prevented the assessment of irritation due to eye staining blue

9.1.6 Skin Sensitisation (7)

Result: mild sensitiser

Species/strain: Albino guinea-pigs (Alpk: Dunkin-Hartley) *Number of animals:* 20 test, 10 control

Induction: Injections of 0.05 - 0.1 mL FCA plus corn oil (1:1); 3% (w/v) notified chemical in corn oil; 3% (w/v) notified chemical in FCA plus corn oil (1:1). Topical induction at day 8: 75% (w/v) notified chemical in corn oil

Results:

Challenge Concentration	24 hrs		48hrs	
	test	control	test	control
30%	4/20	0/10	0/20	0/10
75%	5/20*	2/10	1/20*	0/10

All positive responses were scattered mild redness

* only 1 animal exhibited a positive response at both 24 and 48 hours so that 5 animals in all were sensitised - a rate of 20%.

Test Method: directive 84/449/EEC (2) Test B1

9.2 Repeated Dose Toxicity (8)

Species/strain: Rat - Wistar derived (AlpK: APFSD)

Number/sex: 5 M, 5 F per dose with additional 5/sex in control and high dose groups

Method of administration (vehicle): gavage (corn oil)

Dose/ Duration of administration: 0, 50, 250 and 1000 mg/kg/day; 7 days per week with a 14 day recovery period for control and high dose groups

Toxicologically Significant Observations:

1. Clinical

None

2. Clinical Chemistry/Haematology

None

3.. Necropsy Findings/ Histopathology

No effects were observed at 1000 mg/kg/day.

Test Method: directive 84/449/EEC (2) Test B1

9.3 Genotoxicity

9.3.1 Salmonella typhimurium Reverse Mutation Assay (9)

Result: weakly mutagenic

Comments: positive result in *Salmonella typhimurium*, TA 1535, up to 3.3 times background at a maximum of 1.3 X 10^{-2} mutants per μg (with S9) and *Escherichia coli WP2P and* WP2*uvrA,* 1.9 times background at a maximum of 1.7 X 10^{-1} and 6.4 X 10^{-2} mutants per μg per plate (with S9) respectively, with indications of a dose-response relationship

Strains: *Salmonella typhimurium* TA 1535, TA 1537, TA 98 and TA 100 and *Escherichia coli* W2P2*uvrA*(pKM101) and WP2 (pKM101)

Metabolic activation: rat liver S9 *Solvent:* dimethylsulfoxide

Concentration range: 200 - 5144 μg/ plate

Test Method: directive 84/449/EEC (2) Test B1

9.3.2 *In Vitro* Cytogenetic Assay in Human Lymphocytes (10)

Result: non-clastogenic

Cell Culture: PHA-stimulated peripheral blood lymphocytes in RPMI-1640 tissue culture medium, 48 hour growth prior to treatment. Sampling times: 68 hours (male and female donors) and 92 hours (female donor)

Metabolic activation: rat liver S9 *Doses:* 1 - 500 μg/mL

Comments: *No* statistically or biologically significant increases in the percentage of aberrant cells, compared to the medium controls, were observed at 68 hours response.

Test Method: directive 84/449/EEC (2) Test B1

9.4 Overall Assessment of Toxicological Data

The notified chemical is non-toxic via the oral and dermal routes in the rat with both LD_{50} > 2000 mg/kg. It is a slight irritant to the skin and a moderate irritant to the eye of the rabbit. It is a mild sensitiser to the skin of the guinea-pig. When rats were treated orally with up to 1000 mg/kg/day for 28 days, no effects were observed. Substance H112793 was found to be weakly mutagenic in *vitro* to *Salmonella typhimurium* TA 1535 and *Escherichia coli* WP2uvrA (pKM101) and WP2 (pKM101) only in the presence of metabolic activation. Non-clastogenic in the PHA-stimulated peripheral blood lymphocytes in RPMI-1640 tissue.

On the basis of submitted data, the notified chemical would be classified as hazardous in accordance with Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1994)] in relation to irritant effects (eye), but will not be classified

hazardous in relation to acute lethal effects (oral, dermal) irritant effects (skin), repeated or prolonged exposure (oral route), sensitising effects (skin), clastogenic nor can be classified as as hazardous only from mutagenic effects in, *in vitro*, *Salmonella typhimurium* and *Escherichia coli* tests.

10. ASSESSMENT OF ENVIRONMENTAL EFFECTS

Ecotoxicity tests were performed using Substance H112793 and the results (table 1) were provided by the notifier. These tests were performed in accordance with standard EEC test methods and at facilities complying with OECD principles of GLP.

In the fish study mean measured concentrations ranged from 83-93% of nominal concentrations. Observations of toxicity symptoms were not possible in the test solutions with nominal concentration > 100 mg\l due to the intensity of the colour caused by the notified chemical. No fish mortalities were obsereved in the test solution.

For the *Daphnia* study the mean measured concentration at the start and end of the test was 72% of the nominal value of 130 mg\l. During testing no *Daphnia* were classed as immobile. The test solution was a clear, dark blue liquid.

The test results indicate that the notified chemical is practically non-toxic to the aquatic species tested above.

Algal growth inhibition testing indicated that the notified chemical was slightly toxic in terms of biomass and practically non-toxic with respect to growth rate. Measured test concentrations at the start of testing ranged from 86 - 104% of nominal values. The slight activity measured may be attributed to the reduced light transmittance through the test solution and a possible reduction in photosynthetic activity resulting from the colouration of the test solution by the notified chemical.

The potential effects of the active on sewage treatment were investigated under aerobic and anaerobic conditions. Under aerobic conditions a 1000 mg/l (nominal) of the notified substance in activated sludge caused a 11% inhibition in the respiration rate of the microorganisms (11). This result indicates no significant inhibition particularly as the concentrations expected in sewage treatment plants will be significantly lower. A 7% reduction in the nitrification ability of the activated sludge was caused by a nominal test concentration of 1000 mg/l (12). Under anaerobic conditions, concentrations of up to 2.5% w/w of the active were reported to have inhibited gas production by only 10% indicating that no significant effects were expected during anaerobic sewage treatment.

Table 1. Ecotoxicity test results (mean measured concentrations)

Species	Test	Result
Rainbow Trout, *Oncorhynchus mykiss*	96 hour acute	LC_{50} = >150 mg/l
Daphnia, *Daphnia magna*	acute immobilisation 48 h OECD TG 203	EC_{50} > 130 mg/l
Algae *Selenastrum capriconutum*	Growth Inhibition OECD TG 201	Biomass: NOEC = 1.56 mg/L E_bC_{50} = 23 mg/l Growth rate : NOEC = 1.56 mg/l E_rC_{50} > 100 mg/l
Activated sludge	ETAD Method 103	11% inhibition of respiration at 100 mg/l EC_{50} > 1000 mg/l

11. ASSESSMENT OF ENVIRONMENTAL HAZARD

Substance H112793 is not expected to present a hazard to the environment. During normal use the chemical will be bound to the treated substrate.

The disposal of uncured inks will be largely confined to residues contained in colour cartridge systems which do not allow the replacement of individual colours. These residues are expected to remain in the cartridge housing.

Recycling of treated paper could result in the release of a proportion of the notified chemical to the aquatic compartment where it will be rapidly diluted to environmentally negligible levels. Where recycling does not occur, the notified chemical will be widely dispersed in landfills around Australia where it is expected to remain bound to the treated paper. In the event of leaching the environmental effects are expected to be negligible due to the low toxicity and low bioaccumulation potential of the notified chemical.

Spills of the dye should not present an environmental hazard when cleaned up according to the MSDS sheets.

12. ASSESSMENT OF PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY EFFECTS

The notified chemical is to be used in ink-jet reprographic processes. Exposure during normal handling is not expected through the use of containment, other than in the unlikely event that the cartridge is faulty and ruptures.

The toxicological profile of Substance H112793 suggests that it is unlikely to produce acute toxic effects following ingestion or dermal contact, although it is expected to be a slight skin irritant, a moderate eye irritant and a weak mutagen. The notified chemical is a mild skin sensitiser. The results of the sub-acute 28-day oral toxicity test suggest the notified chemical does not have the potential to cause systemic toxicity due to prolonged exposure.

Given the low intrinsic health hazard of the notified chemical together with expected low exposure, the occupational health risk arising from use is expected to be minimal.

13. RECOMMENDATIONS

To minimise occupational exposureto Substance H112793 the following guidelines and precautions should be observed:

. in the event of a spill to reduce exposure of Substance H112793 to a safe level, personal protective devices which conform to and are used in accordance with Australian Standards (AS for eye protection (AS 1336, AS 1337) (13,14), impermeable gloves (AS 2161 (15) and overalls; and

. a copy of the Material Safety Data Sheet should be easily accessible to employees.

14. MATERIAL SAFETY DATA SHEET

The Material Safety Data Sheet (MSDS) for Substance H112793 was provided in Worksafe Australia format (16).

This MSDS was provided by ICI (Operations) Pty Ltd as part of their notification statement. The accuracy of this information remains the responsibility of ICI (Operations) Pty Ltd.

15. REQUIREMENTS FOR SECONDARY NOTIFICATION

Under the *Industrial Chemicals (Notification and Assessment) Act 1989*, secondary notification of Substance H112793 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. ICI Project SI/93/0009, June 1993. *Acute Oral Toxicity Study with* H113664 *in Rats*. Zeneca Central Toxicology Laboratory, Cheshire, United Kingdom.

2. EEC Council Directive 84/449 on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous preparations, *Official Journal of the European Communities,* No. L251 (19 September 1984).

3. ICI Project SI/93/0009, June 1993. *Acute Dermal Toxicity Study with* H113664 *in Rats.* Zeneca Central Toxicology Laboratory, Cheshire, United Kingdom.

4. ICI Project SI/93/0009, June 1993. Primary Skin Irritation Study with H113664 in Rabbits. Zeneca Central Toxicology Laboratory, Cheshire, United Kingdom.

5. Draize J H, 1959, 'Appraisal of the Safety of Chemicals in Foods, Drugs and Cosmetics', *Association of Food and Drug Officials of the US,* **49**.

6. ICI Project SI/93/0009, June 1993. *Primary Eye Irritation Study with* H113664 *in Rabbits*. Zeneca Central Toxicology Laboratory, Cheshire, United Kingdom.

7. ICI Projects S!/93/0009 June 1993. *Contact Hypersensitivity to* H113664 *in Albino Guinea Pigs, Maximisation Test*, Zeneca Central Toxicology Laboratory, Cheshire, United Kingdom.

8. ICI Project SH/93/0009, November 1993. *Subacute 28-Day Oral Toxicity Gavage Study with* H113664 *in Rats*. Zeneca Central Toxicology Laboratory, Cheshire, United Kingdom.

9. ICI Projects SH/93/0009 April 1993. *Salmonella typhimurium and Escherichia coliReverse Mutation Assay for Azo dyes* w*ith* H112793. Zeneca Central Toxicology Laboratory, Cheshire, United Kingdom.

10. ICI Project SH/93/0009, September 1993. *In vitro* cytogenetic assay in human lymphocytes *withSubstance* H112793. Zeneca Central Toxicology Laboratory, Cheshire, United Kingdom.

11. ETAD (Ecological and Toxicological Association of the Dyestuffs Manufacturing Industry). Ecological Test Method 103 - A screening test for the Assessment of the Possible Inhibitory Effect of the Chemical Substance on Aerobic Waste-Water Bacteria.

12. Department of the Environment, UK 1980. The Assessment of the Nitrifying Ability of Ativated Sludge (Tentative Methods). HMSO London.

13. Standards Australia, 1982. Australian Standard 1336-1982, *Eye Protection in the Industrial Environment,* Standards Association of Australia Publ, Sydney,.

14. Standards Australia, 1982. Australian Standard 1337-1984, *Eye Protectors for Industrial Applications,* Standards Association of Australia Publ, Sydney,.

15. Standards Australia, 1982. Australian Standard 2161-1978, *Industrial Safety Gloves and Mittens and Mittens (excluding Electrical and Medical Gloves),* Standards Association of Australia Publ, Sydney,.

16. Worksafe Australia, February 1990, *Guidance Note for Completion of a Material Safety Data Sheet.* Australian Government Publishing Service, Canberra.

[ii] The Draize Scale for evaluation of skin reactions is as follows:

Erythema Formation		**Oedema Formation**	
rating		**rating**	
No erythema	0	No oedema	0
Very slight erythema (barely perceptible)	1	Very slight oedema (barely perceptible)	1
Well-defined erythema	2	Slight oedema (edges of area well-defined by by definite raising)	2
Moderate to severe erythema	3	Moderate oedema (raised approx. 1mm)	3
Severe erythema (beet redness)	4	Severe oedema (raised more than 1 mm and extending beyond area of exposure)	4

[ii] The Draize scale for evaluation of eye reactions is as follows:

CORNEA			
Opacity	**rating**	**Area of Cornea involved**	**rating**
No opacity	0 none	25% or less (not zero)	1
Diffuse area, details of iris clearly visible	1 slight	25% to 50%	2
Easily visible translu cent areas, details of iris slightly obscure	2 mild	50% to 75%	3
Opalescent areas, no details of iris visible, size of pupil barely discernible	3 moderate	Greater than 75%	4
Opaque, iris invisible	4 severe		

CONJUNCTIVAE					
Redness	**rating**	**Chemosis**	**rating**	**Discharge**	**rating**
Vessels normal	0 none	No swelling	0 none	No discharge	0 none
Vessels definitely injected above normal	1 slight	Any swelling above normal	1 slight	Any amount different from normal	1 slight
More diffuse, deeper crimson red with individual vessels not easily discernible	2 mod.	Obvious swelling with partial eversion of lids	2 mild	Discharge with moistening of lids and adjacent hairs	2 mod.
Diffuse beefy red severe	3 severe	Swelling with lids half-closed	3 mod.	Disharge with moistening of lids and hairs and considerable area around eye	3
		Swelling with lids half-closed to completely closed	4 severe		

IRIS	
Values	**rating**
Normal	0 none
Folds above normal, congestion, swelling, circumcorneal injection, iris reacts to light	1 slight
No reaction to light, haemorrhage, gross destruction	2 severe