South East Koi Club
英國錦鯉愛好會東南俱樂部

Water Management
錦鯉品評會用水處理

Vers 1.3 June 2010

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Version Control.

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Authors:

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Purpose:

The purpose of this document is to lay down clear guidelines and where necessary, codes of conduct for show officials of the ***South East Koi Club*** engaged in the provision and management of water at South East Shows.

"Having represented fish during the revision of the Animal Welfare Act I now see firsthand how the legislation has improved animal welfare generally and the best interests of Koi specifically. The ethos of the Act has been understood by the South East Koi Club members and well demonstrated in their Rules and Guidelines for use at all Koi shows held under their auspices to ensure the highest possible Koi welfare standards."

Dr P A Reynolds BSc PhD BA Consultant in Fish Medicine.
19th June 2010 .

1. Water Reports:

1.1 A water report must be obtained from the water authority three weeks before the show.

1.2 The water authority must be contacted 7 days before the show to ascertain recent change to water parameters.

1.3 The following tests must be carried out by us on the week preceding the show – Ammonia, Nitrite, Nitrate, Phosphate, Copper, Dissolved Oxygen, pH, Free Chlorine, Total Chlorine, Chloramines and Total Alkalinity.

2. Equipment:

The following equipment should be available for water management and it is the responsibility of the water management team to ensure that it is fit for purpose.

- Cock and T bar.
- 3 inch Hoses in sufficient lengths to reach the furthest Show site extremity from the hydrant with sufficient spare hoses to replace a minimum of 6 sections in an emergency.
- 7 Reservoir vats for Centre ring.
- 4 Central reservoir vats for Dealers.
- 15 Auxiliary reservoir vats per dealer(s).
- 40 Show vats for Centre ring.
- 4 Contingency vats for Centre ring.
- 2 Recovery vats for Centre ring.
- 4 Waste water vats for Centre ring.
- Chlorine test kit.
- Hanna test meter with minimum of 6 cuvets.
- Tetra Ammonia test kits as back up (4 trade packs).
- Disposable plastic cups.
- Dissolved Oxygen Tester.
- Infra red temperature meter.
- pH meter.
- Air Blowers inc spare.
- Air pumps inc spare.
- Overhead air ring main.
- Waste water evacuation main.
- Airline and airstones.
- Zeolite in-vat filters.
- Disinfectant. (e.g. Virkon, Virkon S, Virasure Koi, FAM30).

2.1 Equipment Preparation:

2.1.1 All vats to be inspected and cleaned a minimum of one week before the show.

2.1.2 All zeolite filters to be dismantled and emptied of zeolite before the show.

2.1.3 New zeolite is to be obtained and installed in the zeolite filters before installation in the vats.

2.1.4 All sections of 3inch hose to be cleansed with mains water under pressure for 3 minutes before commencing to fill vats.

2.1.5 All show vats to be filled and examined for leaks prior to being declared suitable for displaying exhibits.

2.1.6 Electronic test meters to be tested and recalibrated if necessary.

2.1.7 Internal water ring main to be pressure tested before the arrival of exhibits to ensure no leaks and is fit for purpose.

2.1.8 Overhead air system to be tested before exhibits arrive, airstones to be replaced as necessary.

CAUTION !

FAM30 contains both phosphoric & sulphuric acid besides iodine. It is a considerable skin irritant so prolonged exposure is not recommended.
Be sure to rinse hands and arms after use.

3. Personnel.

Water Management personnel shall consist of :-

Water Testers – whose responsibility is to test the water parameters in the show vats & reservoirs and organise the water changes.

Water Changers – who are responsible for physically changing the water.

These titles are roles; the personnel involved can interchange responsibilities providing both are competent or are under training by a competent exponent of the pertinent role.

The Water Management team is augmented by the ***Chief Bencher*** and ***Koi Welfare Officer*** whose teams constantly conduct a non-scientific monitoring of the condition of the exhibits and the water. They will advise the Water Testers of any suspicion of water quality issues indicated by the behaviour of the exhibits.

The roles and responsibilities of the Benching staff are beyond the scope of this document, but are covered in their own documented set of procedures initiated at the time of this document and updated as and when necessary.

3.1 Chief Tester.

Is the nominal title of the co-ordinating official of the TestingTeam irregardless of the role being undertaken at any time.

3.2 Head of water changing teams.

Is the nominal title of the co-ordinating official of the Testing Team irregardless of the role being undertaken at any time.

4. Roles & responsibilities.

"Water testing is carried out in bio-secure conditions away from the vats to prevent cross contamination"

4.1 Testers.

4.1.1 Should be cognizant of the ***South East Show Rules & Guidelines***. And are responsible for the correct testing of water parameters pertaining to the correct running of the show. (See Appendix B).

4.1.2 Are responsible for obtaining water samples from the show vats.

4.1.3 Are responsible for ensuring the bio-secure integrity of each vat is not compromised whilst samples are being obtained.

4.1.4 Must use each vat's dedicated syringe for obtaining samples, or disinfected sample cups.

4.1.5 Must ensure dedicated syringes are not removed from their dedicated vats.

4.1.6 Must ensure that water testing utensils and equipment (other than disinfected sample cups) do not come into contact with the water in the show vats.

4.1.7 Must report suspected welfare issues to the Chief Tester.

4.2 Changers.

4.2.1 Are responsible for carrying out water changes as dictated by the Chief Tester.

4.2.2 Should be equally cognizant of the ***South East Show Rules & Guidelines***.

4.2.3 Are responsible for ensuring the bio-security of every vat is not compromised during water changes.

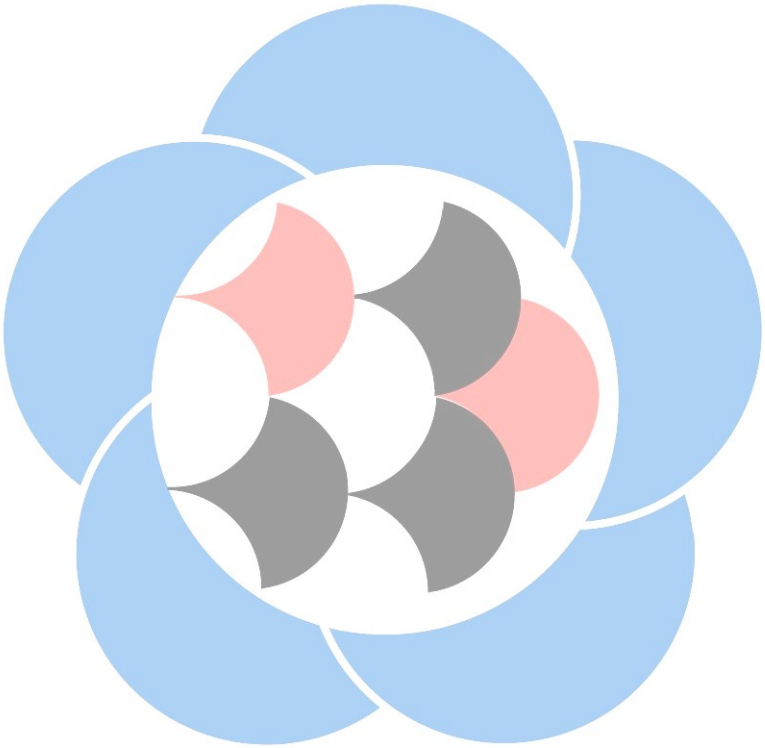
4.2.4 Must ensure that the detachable hoses that enter the show vats are disinfected between each and every water change.

4.3 Chief Tester.

4.3.1 Must relay precise instructions to the Water Changer of vats to be changed and precise amounts (expressed as a percentage) to be changed.

4.3.2 Must correlate suspected Koi welfare issues identified by the Testing Team and liaise with the Koi Welfare Officer.

4.3.3 Must advise ***Vat Allocation Officer*** of the “floating time” for arriving exhibits, The Default value will be assumed to be 45 minutes unless instructed otherwise.



5. Guidelines.

5.1 General.

5.1.1. Vats are to be filled in the following order.
1. Show Vats.
2. Centre ring reservoirs.
3. Dealer Main reservoirs.
4. Dealer auxiliary reservoirs.

5.1.2. Vats are to be de-chlorinated in the same order.

5.1.3. Vats to be aerated as soon as is practicable to ensure that Oxygen saturation is achieved and maintained.

5.1.4. Exhibition vats are to be filled to 15” as a general rule. 3 metre vats to 18”. Any vat containing large size six and size seven koi will be adjusted to 18”.

5.1.5. Visible detritus will be periodically removed from the exhibitor’s vats by the use of hand-vacuums or small hand-nets. These utensils must be disinfected and rinsed after use on each vat, before being used on another.

5.1.6. Water will be refreshed in the exhibition vats if clarity becomes an issue irrespective of prevailing water quality.

5.1.7. No smoking, eating or drinking is permitted whilst actually testing or changing water in the centre ring.

5.1.8. If time and demand permits, the vats of exhibitors travelling long distances home can be freshened up with the remaining reservoir water on the final afternoon of the show prior to debenching.

5.1.9. Club equipment must not come into contact with Dealers vats or their livestock. The club provides and maintains water quality and quantity in the Dealers reservoirs. This service is part of the dealers package. No inducements or gratuities are to be sought by any Club member involved in Water Management as it could rightly be construed as holding animal welfare to ransom.

5.2 Water Testing.

5.2.1 Tests for Ammonia are to be conducted at least every three hours throughout the day.

5.2.2 Tests for Oxygen, pH and temperature must be conducted at the same time as the Ammonia test.

5.2.3 Vats recording 75% of the maximum allowable value of the Total Ammonia reading are to be transferred to the '***Hot list***' and are to remain there until the value has stabilised below 50%.

5.2.4 Vats on the Hot List are to be tested hourly for Ammonia.

5.2.5 Individual vat tests can be taken using the dedicated syringe stored at the vat. These syringes are not to be used when collecting multiple samples from different vats.

5.2.6 Multiple samples are to be collected using disposable plastic cups.

5.2.7 Sample cups are to be sterilised and cleaned between tests.

5.3 Water Changing.

5.3.1 The amount of water to be changed will be decided by the Chief Tester and relayed on paper to the Head of the Water Team who will ensure that the task is allocated and carried out.

5.4 Water Clarity.

5.4.1 It is possible that water conforming to and within the acceptable parameters for show vats may appear cloudy and prevent the clear observations of the koi. While the South East Koi Club accepts that this is not immediately detrimental to the exhibits' welfare, it does prevent them being displayed properly and during judging may result in koi being lifted unnecessarily. Therefore when clarity is an issue, frequent water changes will be deployed to improve clarity.

5.5 Water Disposal.

5.5.1 Waste water from water testing will be disposed of in a manner that does not pose a risk of contamination to the environment.

5.5.2 Waste water from exhibition and reservoir vats will be disposed of in accordance with the instructions supplied by the site's groundsman.

6. Authority.

6.1.1 The ultimate authority for the show and the conduct of the Water Management staff lies with the *Show Chairman*, or his named delegate of authority.

6.1.2. Disputes between exhibitor and the club's water teams are covered by rule 1.1.1. of the ***South East Show Rules & Guidelines***.

7. Contingency vat procedure.

The Contingency vats (4) are reserved for fish in the unlikely event that they jump from their vats. Centre ring officials finding fish that have jumped are to place them in the Contingency vat unless they have personally witnessed the jump and are therefore 100% certain of the vat the fish came from. If in any doubt – follow procedure. At no time should any cross contamination be risked.

Once the fish is settled examine the vats in the vicinity reconciling the content against the photographs affixed to the vat. Once the correct location is identified the fish can be returned to its vat using the recognised procedure[#6] for moving fish.

Then contact the Benching Admin advising them of the situation, the photo number of the fish so that the owner can be contacted and advised.

Once used in this manner the Contingency vat must be emptied, disinfected and dried before refilling for further use.

8. Recovery Vats.

Two Recovery Vats are located within the Centre Ring under the responsibility and control of the Koi Welfare Team.

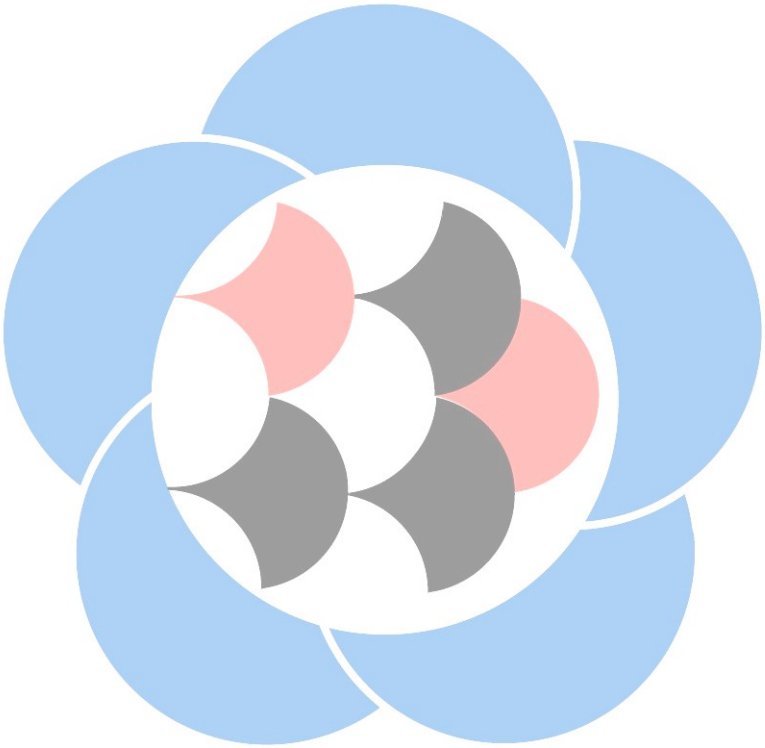
They are to be set up according to the same procedure and water quality criteria as the Exhibition Vats and then excluded from the water testing regime until occupied.

Once occupied their water testing regime is to be co-ordinated with the Chief Welfare Official.

Once the occupant(s) are removed the Recovery Vat is to be emptied, disinfected and dried before refilling for further use.

Should both Recovery Vats be in use then the Exhibition Vat will be used, However the vat will be covered and all its occupants removed from the competition, i.e. they will not be judged.

9. Notes.



10 Definitions.

Benching as defined in the South East Koi Club's Benching Admin Model under Fish Management.

"***Fish Management Function***. *This team are responsible for the physical examination of the fish and their classification and measurement. During this phase the fish will be released from their bags and preferably handed into the Benching Bowl where they will be subjected to a quick but thorough examination to ensure that they comply with the Benching Protocol regarding health matters. Next, they are categorised into one of the 13 Show classifications and measured for size. A team of two minimum, three optimum is required for this function. One to remove fish from the bags, another to assist, and the third to carry out the examination and classification. Obviously people involved in this part of the process need to be efficient at handling fish and fully conversant with the show rules and show classifications. Furthermore, they need to diplomatic and circumspect when dealing with members of the public. Their behaviour reflects heavily on our public relations and reputation.*"

South East's Benching Admin Model refers to the documents published in the January 1994 edition of the BKKS' magazine and Spotlight July 2003.

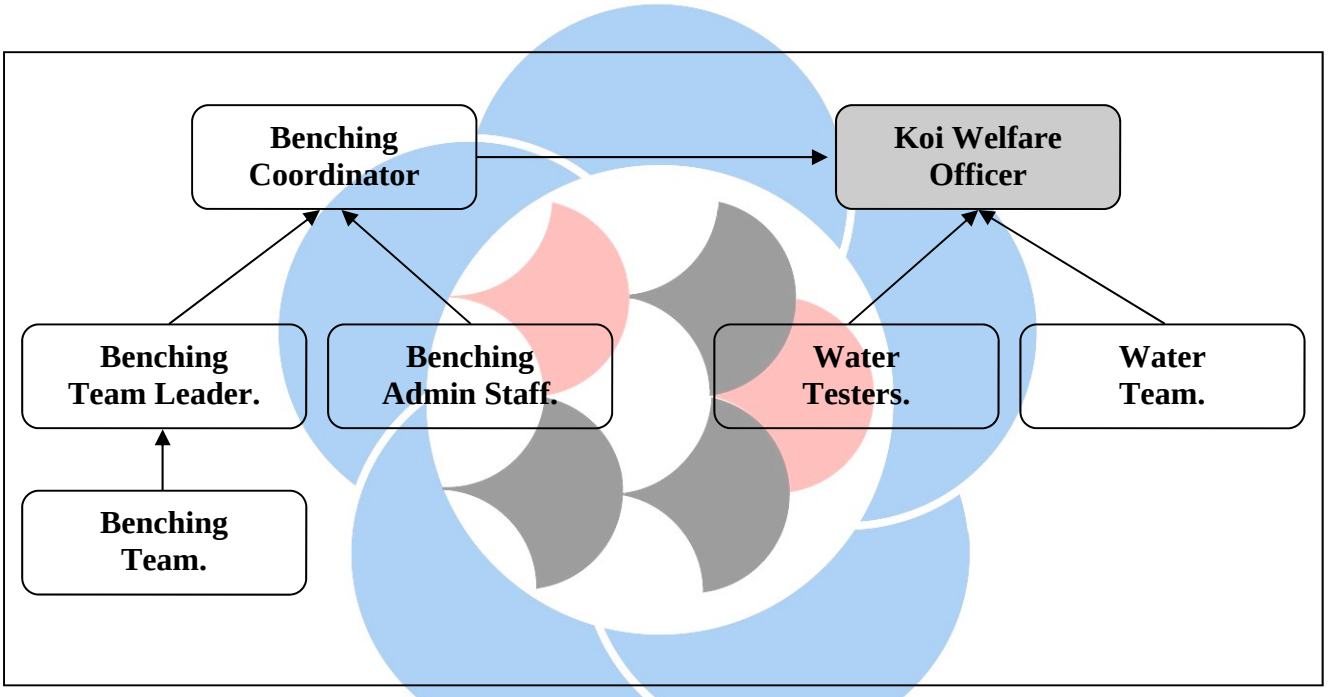
Non Scientific water Checks (NSC's) are summary inspections carried out by the centre ring staff who will report any suspect conditions, e.g. smelly vats, scummy surface water, abnormal fish behaviour.

Appendix A: Non Scientific water Checks (NSC's).

A.1.1 NSC's are an integral part of all Centre Rings staff's procedures and training. Founded upon informed observation NSC's are there to ensure timely reporting of suspected issues to the relevant team leader.

A.1.2 The hierarchical approach is strategically designed to prevent duplication of information and subsequent time wasting.

A.1.3 Those involved in water testing, water changing and benching should report NSC's to their team leader and leave them to liaise with the Water Tester or Welfare Official.



Diag 2 – Non Scienfitfic water Check hierarchy.

Appendix B: Water Quality Criteria.

B1.1 All water must conform to the following parameters in both exhibition and reservoir vats. Tests performed by the South East Koi Club are after de-chlorination.

Parameter	Level	Test Method
Total Chlorine	<0.02mg/l	DPD4 Tablet
Free Chlorine	zero	DPD1 Tablet
Free Ammonia	<0.02mg/l	Hanna Meter
Nitrite	<0.2mg/l	Hanna Meter
Nitrate	<300mg/l	Hanna Meter
pH	Min 7.5 – Max 8.5	pH Meter
Dissolved Oxygen	>80% saturation	0_2 Meter
Copper	<0.015mg/l	Hanna Meter
Phosphate	<10mg/l	Hanna Meter
Total Alkalinity	>90mg/l	Palin TA Tablet
Zinc	<0.03mg/l	Water Report
Iron	<0.03mg/l	Water Report
Aluminium	<0.01mg/l	Water Report

Appendix C: Oxygen Saturation Table.

Saturation values of oxygen in fresh water at sea level
(Maximum level of oxygen a display vat or pond can hold)

Temperature ^{0}C	0	5	10	15	20	25	30
Oxygen mg/l (ppm)	14.6	12.8	11.3	10.1	9.1	8.2	7.5

Guidelines for show vat aeration

Warmer water can hold less oxygen than cooler water and the table shows the saturation values of oxygen in fresh water at a range of temperatures, i.e. the maximum amount of oxygen that the water can hold at that temperature. Normal means of aeration, such as air-stones, will not increase the dissolved oxygen content of vat water above these levels regardless of how many extra air-stones are added.

The values in the table should be considered as the target values for dissolved oxygen in show vats. It will be difficult to reach 100% of these saturation values but as near as is possible should be the aim. For example 90% of the saturation value should be achievable, and extra aeration should be considered if the actual measured value is less than 80% of the table value.

By ensuring the highest dissolved oxygen value that is achievable, there will be a reservoir of dissolved oxygen in the vat water so that Koi welfare will not be jeopardised if there is a temporary interruption to the aeration such as a short power cut or if the air-stones are temporarily removed to facilitate judging or photography. During judging or for photography purposes, it is acceptable for air-stones to be lifted and held just above water level to allow better visibility of the Koi. This must only be done by designated personnel who have the Show Chairman's permission to do so. Such personnel should be aware that careful attention should be paid to ensuring that air-stones are not lifted in such a manner that there is a risk that fine water droplets will be sprayed into other vats and that air-stones should not be removed for any longer than is necessary. Under no circumstances should air-stones be lifted from the vat and left on the ground. Air lines to air-stones should be positioned where they are inaccessible to the public to ensure that only designated personnel can remove air-stones.

The more highly the vat water is aerated, the more ammonia will be "gassed off", and the more carbon dioxide will be removed from the water. Reduction of ammonia is always desirable and removing carbon dioxide will help stabilise the pH by preventing downward variations.

The oxygen saturation table is for fresh water only. Adding salt to vat water will result in the water being unable to hold as much oxygen as in the table but this reduction will not be great for all normal dose rates of salt.

Appendix D: Ammonia Tolerance Table.

Maximum allowable value of Total Ammonia for show vats at a two day koi show.

Temperature ^{0}C

↓ pH	10	12	14	16	18	20	22	24	26	28	30
7.0	10.5	9.52	8.00	6.90	5.88	5.00	4.44	3.85	3.45	2.94	2.50
7.1	8.70	7.40	6.25	5.41	4.76	4.00	3.51	3.03	2.70	2.38	2.00
7.2	6.90	5.88	5.00	4.35	3.77	3.17	2.82	2.41	2.17	1.89	1.59
7.3	5.41	4.65	3.92	3.45	2.99	2.53	2.22	1.92	1.72	1.49	1.27
7.4	4.26	3.70	3.13	2.74	2.38	2.02	1.77	1.54	1.37	1.19	1.01
7.5	3.39	2.94	2.50	2.17	1.89	1.61	1.41	1.23	1.09	0.94	0.81
7.6	2.70	2.35	2.00	1.72	1.50	1.28	1.12	0.98	0.86	0.75	0.64
7.7	2.17	1.87	1.59	1.38	1.20	1.02	0.90	0.78	0.69	0.60	0.51
7.8	1.72	1.48	1.27	1.10	0.96	0.82	0.72	0.59	0.55	0.48	0.41
7.9	1.37	1.18	1.01	0.87	0.76	0.65	0.57	0.50	0.44	0.38	0.33
8.0	1.09	0.94	0.81	0.70	0.61	0.52	0.46	0.40	0.35	0.30	0.26
8.1	0.87	0.75	0.64	0.56	0.49	0.42	0.37	0.32	0.28	0.24	0.21
8.2	0.70	0.60	0.52	0.45	0.39	0.34	0.30	0.26	0.22	0.20	0.17
8.3	0.56	0.48	0.41	0.36	0.32	0.27	0.24	0.21	0.18	0.16	0.14
8.4	0.45	0.39	0.33	0.29	0.26	0.22	0.20	0.17	0.15	0.13	0.11
8.5	0.36	0.31	0.27	0.23	0.20	0.18	0.16	0.14	0.12	0.10	0.09

Typical temperature and pH ranges encountered at the South East Show.

Ammonia is a waste product that is continuously excreted by Koi (and other fish species) into their environment where it splits into two forms, free ammonia (NH_3) and ionised ammonia (NH_4). The proportion of each is dependent on the water pH and temperature. Free ammonia is toxic to Koi, ionised ammonia is relatively non-toxic.

Typical electronic and manual test kits cannot distinguish between the two forms, they only measure total ammonia which, as the name implies, is the combined total of the two. Low levels of free ammonia are tolerated and best practice in Koi keeping is to prevent it from building up to harmful levels.