

**Government of the Union of Myanmar**  
**Ministry of Livestock and Fisheries**  
**DEPARTMENT OF FISHERIES**

**DIRECTIVE No. (5/98)**

August 3, 1998

In exercise of the powers conferred by Section 23 of the Myanmar Marine Fisheries Law 1990, the Director General of the Department of Fisheries hereby issues the following Directive for quality of water & ice standard for fishery industry.

**Water and Ice Standard for Fishery Industry**

- 1.1 This Directive concerns standard for water intended for human consumption.
- 1.2 For the purpose of this Directive, water intended for human consumption shall mean all water used for that purpose, either in its original state or after treatment regardless of origin,
  - (i) whether supplied for consumption, or
  - (ii) whether
    - (a) used in food production of fish and fishery products undertaking for the manufacture, processing, preservation or marketing of products or substances intended for human consumption and;
    - (b) affecting the wholesomeness of the fish & fishery products in its finished form.
- 2.1 Any licence-holder for the processing of fish and fishery products shall abide by this Directive as one of the conditions of the licence.

- 2.2 On violation of the any terms or conditions of the Directive, criminal action may be taken under Section 45 of the Myanmar Marine Fisheries Law 1990 and the licence-holder may also be liable to suspension, revocation, termination and cancellation of the licence under Section 24 of the said Law.

Sd xx Soe Win  
Director General  
Department of Fisheries.

**ANNEX 1**

**LIST OF PARAMETERS**

**A. ORGANOLEPTIC PARAMETERS**

	Parameters	Expression of the results	Guide level (G.L)	Maximum admissible concentration (MAC)	Comments
1.	Colour	mg/l pt Co scale	1	20	
2.	Turbidity	mg/l SiO <sub>2</sub> Jackson units	1 0.4	10 4	Replaced in certain circumstances by a transparency test, with a Secchidisc reading in meters; GL : 6m MAC : 2m
3.	Odour	Dilution number	0	2 at 12°C 3 at 25°C	To be related to the tests.
4.	Taste	Dilution number	0	2 at 12°C 3 at 25°C	To be related to the tests.

**B. PHYSICO-CHEMICAL PARAMETERS**

**(in relation to the water's natural structure)**

	Parameters	Expression of the results	Guide level (G.L)	Maximum admissible concentration (MAC)	Comments
5.	Temperature	°C	25	30	
6.	Hydrogen concentration	pH unit	6.5 ≤ pH ≤ 8.5		-The water should not be aggressive. -The pH values do not apply to water in closed containers.

	Parameters	Expression of the results	Guide level (G.L)	Maximum admissible concentration (MAC)	Comments
7.	Conductivity	$\mu\text{S cm}^{-1}$	400		- Corresponding to the mineralisation of the water. - Corresponding relativity values in ohms/cm: 2.500.
8.	Chlorides	Cl mg/l	25		Approximate concentration above which effects might occur 200mg/l
9.	Sulphates	$\text{SO}_4$ mg/l	25	250	
10.	Silica	$\text{SiO}_2$ mg/l	-	-	
11.	Silica	Ca mg/l	100	-	
12.	Magnesium	Mg mg/l	30	50	
13.	Sodium	Na mg/l	20	17.5 (as from 1984 and with a percentile of 90)  150 (as from 1987 and with a percentile of 80)	- The value of the this parameter take account of the recommendation of a WHO working - party (The Hague, May 1978) on the progressive reduction of the current total daily salt intake to 6 g.  - As from 1 January 1984 the Commission will submit to the Council reports on trends in the total daily intake of salt per population.

	Parameters	Expression of the results	Guide level (G.L)	Maximum admissible concentration (MAC)	Comments
				(these percentiles should be calculated over a reference period of three years)	<p>† In these reports the Commission will examine to what extent the 120 mg/l MAC suggested by the WHO working party is necessary to achieve a satisfactory total salt intake level, and if appropriate, will suggest a new salt MAC value to the Council &amp; a deadline for compliance with that value.</p> <p>† Before 1 January 1984, Commission will submit to the Council a report on whether the reference period of three years for calculating these percentiles is scientifically well founded.</p>
14.	Potassium	K mg/l	10	12	
15.	Aluminium	Al mg/l	0.05	0.2	
16.	Total hardness				- See Table F page 23
17.	Dry residues	mg/l after drying at 180°C	1500		
18.	Dissolved Oxygen	%O <sub>2</sub> saturation			- Saturation value > 75% except for underground water.
19.	Free carbon dioxide	CO <sub>2</sub> mg/l			- The water should not be aggressive.

**C. PARAMETERS CONCERNING SUBSTANCES UNDESIRABLE  
EXCESSIVE AMOUNTS (1)**

	Parameters	Expression of the results( )	Guide level (G.L)	Maximum admissible concentration (MAC)	Comments
20.	Nitrates	NO <sub>3</sub> mg/l	25	50	
21.	Nitrites	NO <sub>2</sub> mg/l		0.1	
22.	Ammonium	NH <sub>4</sub> mg/l	0.05	0.5	
23.	Kjeldahl Nitrogen (excluding N in NO <sub>2</sub> & NO <sub>3</sub> )	N mg/l		1	
24.	(K Mn NO <sub>4</sub> ) Oxidizability	O <sub>2</sub> mg/l	2	5	- Measure when heated in acid medium
25.	Total organic carbon (TOC)	C mg/l			- The reason for any increase in the usual concentration be investigated.
26.	Hydrogen sulphide	S µg/l	undetectable organolepucally		
27.	Substances extractable in chloroform	mg/l dry residue	0.1		
28.	Dissolved or emulished hydrocarbons (after extraction by petroleum ether): Mineral Oils	µg/l		10	

	Parameters	Expression of the results	Guide level (G.L)	Maximum admissible concentration (MAC)	Comments
29.	Phenols (phenol index)	$N_2H_3OH \mu g/l$		0.5	- Excluding natural phenols which do not react to chlorine
30.	Boron	B $\mu g/l$	1000		
31.	Surfactuants (reacting with methylene blue)	$\mu g/l$ (by: sulphate)		200	
32.	Other (organochlorine compounds not covered by parameter No.55)	$\mu g/l$	1		- Haloform concentrations must be as low as possible.
33.	Iron	Fe $\mu g/l$	50	200	
34.	Manganese	Mn $\mu g/l$	20	50	
35.	Copper	Cu $\mu g/l$	100 -- at outlets of pumping and/or treatment works and their subsation  300 -- after the water has been standing for 12 hours in the piping and at the point where the water is made available to the consumer.		-- Above 3000 $\mu g/l$ astringent tast discoloration + corrosion may occur.

	Parameters	Expression of the results	Guide level (G.L.)	Maximum admissible concentration (MAC)	Comments
36.	Zinc	Zn µg/l	100 -- at outlets of pumping and/or treatment works and their substations  500 -- after the water has been standing for 12 hours in the piping & at the point where the water is made available to the consumer.		-- Above 5000 µg/l astringent taste, opalescence and sand-like deposits may occur.
37.	Phosphorus	P <sub>2</sub> O <sub>5</sub> µg/l	400	5000	
38.	Fluoride	F µg/l 8° - 12°C 25° - 30°C			-- MAC varies according to average temperature geographical area concerned.
39.	Cobalt	Co µg/l			
40.	Suspended solids		Note		
41.	Residual Chlorine	Cl µg/l			-- See article 8
42.	Barium	Ba µg/l	100		
43.	Silver	Ag µg/l		10	If, exceptionally, silver is used non-systematically to process the water, a MAC value of 10 µg/l may authorized.

**D. PARAMETERS CONCERNING TOXIC SUBSTANCES**

	Parameters	Expression of the results( )	Guide Level (G.L)	Maximum Admissable Concentration (MAC)	Comments
44.	Arsenic	As µg/l		50	
45.	Beryllium	Be µg/l			
46.	Cadmium	Cd µg/l		5	
47.	Cyanides	CN µg/l		50	
48.	Chromium	Cr µg/l		50	
49.	Mercury	Hg µg/l		1	
50.	Nickel	Ni µg/l		50	
51.	Lead	Pb µg/l		50 (in running water)	-- Where lead pipes are present, the lead content should not exceed 50 ug/l in a sample taken after flushing. If the sampel is taken either directly or after flusing and the lead content either frequently or to an appreciable extent exceeds 100 ug/l, suitable measures must be taken to reduce the exposure to lead on the part of the consumer.
52.	Antin.ony	Sb µg/l		10	
53.	Selenium	Se µg/l		10	
54.	Vanadium	V µg/l			
55.	Pesticides and related products - substances considered separately	µg/l		0.1	Pesticides and related products' means: -- insecticides: -- persistent organochlorine compounds -- organophosphorous compounds

Parameters	Expression of the results( )	Guide Level (G.L)	Maximum Admissable Concentration (MAC)	Comments
-- total			0.5	-- carbonates -- herbicides -- fungicides -- PCBs and PCTs
56. Polycyclic aromatic hydrocarbons	µg/l		0.2	-- reference substances: -- flouranthene / benzo 3-4 -- flouranthene/benzo 11-12 -- flouranthene/benzo 3-4 -- pyrene/benzo 1-12 -- perylene/indeno (1,2,3-ed) pyrene

#### E. MICOROBIOLOGICAL PARAMENTRES

Parameters	Results: volume of the sample in ml	Guide Level (G.L)	Maximum Admissible Concertration (MAC)	
57. Total coliforms(!)	100	-	0	MPN<1
58. Fecal coliforms	100	-	0	MPN<1
59. Fecal streptococci	100	-	0	MPN<1
60. Sulphite-reducing Clostridia	20	-	0	MPN<1

Water intended for human consumption should not contain pathogenic organisms.

If it is necessary to supplement the microbiological analysis of water intended for human consumption, the samples' should be examined not only for the bacteria referred to in Table E but also for pathogens including.

- Salmonella.

- pathogenic staphylococci.
- fecal bacteriophages.
- entero - viruses:
- nor should such water contain:
- parasites.
- algas.
- other organisms such as animalcules.

(1) Provided a sufficient number of samples is examined (95% consistent results)

	Parameters		Results size of sample (in ml)	Guide Level (G.L.)	Maximum Admissible Concentration (MAC)	Comments
61	Total bacteria counts for water supplied for human consumption	37°C	1	10 <sup>(1)(2)</sup>	-	
		22°C	1	100 <sup>(1)(2)</sup>	-	
62.	Total bacteria counts for water in closed containers	37°C	1	5	20	On their own responsibility and where parameters 57,58,59 and 60 are complied with, and where the pathogen organisms given on page 22 are absent. Member States may process water for their internal use the total bacte- ria count of which exceeds the MAC values laid down for parameter 62. MAC values should be meas- ured within 12 hous of being put into closed containers with the sample water being kept at aconstant temperature during that 12 hour period.
		22°C	1	20	100	

**F. MINIMUM REQUIRED CONCENTRATION FOR SOFTENED WATER  
INTENDED FOR HUMAN COMPTION**

Parameters	Expression of the results	Maximum required concentration (softened water)	Comments
1 Total Hardness	mg/l Ca	60	Calcium or equivalent actions
2 Hydrogen ion concentration	pH		
3 Alkalinity	mg/l HCO <sub>3</sub>	30	The water should not aggressive
4 Dissolved oxygen			

NB: \_\_\_ The provisions for hardness, hydrogen ion concentration, dissolved oxygen and calcium also apply to desalinated water.

\_\_\_ if, owing to its excessive natural hardness, the water is softened in accordance with Table F before being supplied for consumption, its sodium content may in exceptional cases be higher than the values given in the Maximum admissible concentration column. However, an effort must be made to keep the sodium content at as low a level as possible and the essential requirements for the protection of public health may not be disregarded.

**TABLE OF CORRESPONDENCE BETWEEN THE VARIOUS UNITS OF WATER HARDNESS MEASUREMENT**

	French degree	English degree	German degree	Milligrams of Ca	Millimoles of Ca
French degree	1	0.70	0.56	4.008	0.1
English degree	1.43	1	0.80	5.73	0.143
German degree	1.79	1.25	1	7.17	0.179
Milligrams of Ca	0.25	0.175	0.140	1	0.025
Millimoles of Ca	10	7	5.6	40.08	1

**ANNEX II**

**PATTERNS AND FREQUENCY OF STANDARD ANALYSES**

**A. TABLE OF STANDARD PATTERN ANALYSES (Parameters to be considered in monitoring)**

	Standard analyses Parameters to be considered	Manimum monitoring (C.1)	Current monitoring (C.2)	Periods monitoring (C.3)	Occasional monitoring in special substances or in case of accidents (C.4)
A	ORGANOLEPTIC PARAMETERS	- odour (!) - taste (!)	- odour - taste	- turbidity - (appearance)	The competent national authorities of the Member States will determine the parameters (!)
B	PHYSICO CHEMICAL	- Conductivity or other physico chemical parameter - residual chlorine ( 2 )	- temperature ( 2 ) - conductivity or other physical chemical parameter - pH - residual chlorine (!)	current monitoring analyse + other parameters as in foot note 4	according to consultances taking account of all factors which might have an adverse affect on the quality of drinking water supplied to consumers.
C	UNDESIRABLE PARAMETERS		- nitrites - nitrates - ammonia		
D	TOXICPARAMETERS		.		
E	MICRO BIOLOGICAL PARAMETERS	- total coliform or total counts of 22 and 37 - fecal coliforms	- total coliforms - fecal coliforms - total counts of 22 and 37		

Note : An initial analysis, to be carried out before a source is expiated, should be added. The parameters to be considered would be the current monitoring analysis plus *meter alia* various toxic or undesirable substance presumed prevent. The list would be draw up by the competent national authorities.

- (1) Qualitative assessment.
- (2) Except for water supplied containers.
- (3) Or other disinfectants and only in the case of treatment.
- (4) These parameters will be determined by the competent national authority, taking account of all factory which might after the quality of drinking water supplied to users and which could enable the ionic balance of the constituents to be assessed.
- (5) The competent national authority may use parameters other than those mentioned in Annex 1 to this Directive.

**B. TABLE OF MINIMUM FREQUENCY OF STANDARD ANALYSIS (!)**

Volume of water produced or distributed in m day	Population concerned assuming 200 l day per person	Analysis C1	Analysis C2	Analysis C3	Analysis C4
		Number of samples per years	Number of sample per year	Number of sample per year	
100	500	(1)	(1)	(1)	Frequency to be determined by the competent national authorities as the situation requires
1000	5000	(1)	(1)	(1)	
2000	10000	12	3	(1)	
10000	50000	60	6	1	
20000	100000	120	12	2	
30000	150000	180	18	3	
60000	300000	360 <sup>(2)</sup>	36	6	
100000	500000	360 <sup>(2)</sup>	60	10	
200000	1000000	360 <sup>(2)</sup>	120 <sup>(2)</sup>	20 <sup>(2)</sup>	
1000000	5000000	360 <sup>(2)</sup>	120 <sup>(2)</sup>	20 <sup>(2)</sup>	

- (1) Frequency left to the discretion of the competent national authorities. However, water intended for the food-manufacturing industries must be monitored at least once a year.
- (2) The competent health authorities should endeavour to increase the frequency as far as their resources allow.

- 3) (a) In the case of water which must be disinfected, microbiological analysis should be twice as frequent.
- (b) Where analysis are very frequent, it is advisable to take samples at the most regular intervals possible.
- (c) Where the values of the results obtained from samples taken during the preceding years are constant and significantly better than the limits laid down in Annex I, and where no factor likely to cause deterioration in the quality of the water has been discovered, the minimum frequencies of the analyses referred to above may be reduced:
  - for surface water, by a factor of 2 with the exception of the frequencies laid down for microbiological analyses;
  - for ground water, by a factor of 4 without prejudice to the provisions of point (a) above.