

DRAFT TANZANIA STANDARD

Draft for comments only

CDC 6 (5015) P3

Water for Aquaculture – Specification

TANZANIA BUREAU OF STANDARDS

0 Foreword

This Draft Tanzania Standard is being prepared by the Water Quality Technical Committee, under the supervision of Chemicals Divisional Standards Committee and it is in accordance with the procedures of the Bureau.

Within the aquaculture industry, it is accepted that good water quality is needed for maintaining viable aquaculture production. This results in high profit, high production. Contaminants in water will result in accumulation in the fish and other aquatic organisms which are later on transferred to human consumers thus affecting human health and environment.

This Draft Tanzania Standard is being prepared in order to control quality of water used for aquaculture activities.

For the purpose of deciding whether a particular requirement of this draft Tanzania Standard is complied with, the final value observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with TZS 4.

In the preparation of this Draft Tanzania Standard assistance was drawn from the following:

Australian and New Zealand Environment and Conservation Council, (2000) Guidelines for Fresh and Marine Water Quality, Auckland, New Zealand.

Joseph K. Buttner *et al*, An Introduction to Water Chemistry in Freshwater Aquaculture, NRAC Fact Sheet No. 170-1993, University of Massachusetts, Dartmouth.

Philminaq (2004) Water Quality Criteria and Standards for Freshwater and Marine Aquaculture, Philippine

Ronald D. Zweid *et al*, Source Water Quality for Aquaculture, A Guide for Assessment, The World Bank.

South African Water Quality Guidelines Volume 6: (1996), Agricultural Water Use: Aquaculture Second Edition, published by Department of Water and Forest, Pretoria, South Africa.

Inputs for water quality standards for aquaculture established by Ministry of Water and Irrigation, Tanzania, 2015.

1.0 Scope

This Draft Tanzania standard specifies the requirements, sampling and methods of test of water for aquaculture purposes.

2.0 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- 2.1 ISO 5667-4: Water quality -- Sampling -- Part 4: Guidance on sampling from lakes, natural and man-made.
- 2.2 ISO 5667-6: Water quality -- Sampling -- Part 6: Guidance on sampling of rivers and streams.
- 2.3 ISO 5667-9 Water quality -- Sampling -- Part 9: Guidance on sampling from marine waters.
- 2.4 FTZS 1844/ISO 10523, Water quality -- Determination of pH.
- 2.5 ASTM D 5907: Standard test methods for filterable matter (total dissolved solids) and non-filterable matter (total suspended solids) in water
- 2.6
- 2.7 FTZS 1849/ISO 12020: Water quality -- Determination of aluminium — Atomic absorption spectrometric methods.
- 2.8 FTZS 1846/ISO 11732: Water quality -- Determination of ammonium nitrogen -- Method by flow analysis (CFA and FIA) and spectrometric detection.
- 2.9 FTZS 1859/ISO 7890: Water quality -- Determination of nitrate -- Part 3: Spectrometric method using sulfosalicylic acid.
- 2.10 FTZS 1838/ISO 6777 Water quality -- Determination of nitrite -- Molecular absorption spectrometric method.
- 2.11 ISO 15681:, Water quality -- Determination of orthophosphate and total phosphorus contents by flow analysis (FIA and CFA).
- 2.12 FTZS 1848 /ISO 11969: Water quality -- Determination of arsenic -- Atomic absorption spectrometric method (hydride technique).
- 2.13 FTZS 1850/ISO 12846: Water quality -- Determination of mercury -- Method using atomic absorption spectrometry (AAS) with and without enrichment.
- 2.14 FTZS 1863 /ISO 8288: Water quality -- Determination of cobalt, nickel, copper, zinc, cadmium and lead -- Flame atomic absorption spectrometric methods.
- 2.15 FTZS 1853: Water quality -- Guidelines for selective immunoassays for the determination of plant treatment and pesticide agents.
- 2.16 ISO 19458 Water quality -- Sampling for microbiological analysis.
- 2.17 FTZ 1846/ISO 11732: Water quality -- Determination of ammonium nitrogen -- Method by flow analysis (CFA and FIA) and spectrometric detection.
- 2.18 ISO 9963-2: Water quality -- Determination of alkalinity -- Part 2: Determination of carbonate alkalinity.

2.19 TZO 1130(Part 1) Water Quality - Determination of dissolved anions by liquid chromatography of ions- Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite phosphate and sulfate.

2.20 ASTM D888 – 12 Standard Test Methods for Dissolved Oxygen in Water.

2.21 ASTM D513 – 16 Standard Test Methods for Total and Dissolved Carbon Dioxide in Water.

2.22 ASTM D6764 Standard Guide for Collection of Water Temperature, Dissolved-Oxygen Concentrations, Specific Electrical Conductance, and pH Data from Open Channels.

2.23 TZO 861 (Part 1) (1st Ed) ISO 11923 Water quality – Determination of suspended solids by filtration through glass-fibre filters. 2.24 TZO 729 Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of coliforms – Colony count technique

3.0 Terms and definitions

For the purposes of this draft Tanzania standard, the following terms and definitions shall apply;

3.1

Aquaculture

farming of aquatic (marine or freshwater) organisms including fish, mollusks, crustaceans and plant in controlled or selected aquatic environment, with some form of intervention in the rearing process to enhance production, such as regular stocking, feeding and protection from predators

3.2

Freshwater aquaculture

farming of aquatic species in fresh water

3.3

Freshwater

water that is generally characterized by having low concentrations of dissolved salts and other total dissolved solids

3.4

Marine aquaculture

farming of aquatic species in marine water

3.5

Marine Water

water that contains high salt concentration

4.0 Requirements

Water for aquaculture purposes shall comply with physical, chemical and microbiological requirements as stipulated in table 1, 2, 3 and 4.

Table 1: Physical requirements of water for aquaculture

No.	Parameter	Limits		Test Method
		Freshwater	Marine water	
1.	Temperature, °C	10 - 32	23 - 32	ASTM D6764
2.	pH	6.0 - 9.0	7.0 - 9.5	FTZS 1844
3.	Total Suspended Solids (TSS), mg/L	25 - 150	25 - 150	TZS 861-1
4.	Salinity, mg/L	50 - 2000	2000 - 35000	-
5.	Total Dissolved Solids (TDS), mg/L	500 - 1200	500 - 1200	ASTM D 5907

Table 2: Chemical requirements of water for aquaculture

No.	Parameter (mg/L)	Limits		Test Method
		Freshwater	Marine water	
1.	Dissolved Oxygen (DO), <i>min</i>	3.5	5	ASTM D888 – 12
2.	Carbon Dioxide (CO ₂)	1 - 10	1 - 10	ASTM D513 – 16
3.	Total Alkalinity (as CaCO ₃)	50 - 200	50 - 200	ISO 9963-2:1994
4.	Total hardness (as CaCO ₃)	30 - 100	30 - 100	
5.	Aluminium (Al), <i>max</i>	0.03	0.03	FTZS 1849
6.	Ammonium –N (NH ₄ -N)	0.2 - 2.0	0.2 - 2.0	FTZS 1846
7.	Ammonia –N (NH ₃ –N), <i>max</i>	0.3	0.3	FTZ 1846
8.	Nitrate-N (NO ₃ –N), <i>max</i>	300	300	FTZS 1859
9.	Nitrite- N (NO ₂ –N), <i>max</i>	0.05	0.05	FTZS 1838
10.	Phosphorus (P)	0.03 - 2.0	0.03 - 2.0	ISO 6878
11.	Phosphate (PO ₄), <i>max</i>	0.1	0.05	TZS 1130
12.	Arsenic (As), <i>max</i>	0.05	0.05	FTZS 1848
13.	Mercury (Hg), <i>max</i>	0.5	0.5	FTZS 1850
14.	Lead (Pb), <i>max</i>	1.0	1.0	FTZS 1863
15.	Cadmium (Cd), <i>max</i>	1.0	1.0	FTZS 1863
16.	Nickel (Ni), <i>max</i>	30.0	30.0	FTZS 1863

Table 3: Limits of pesticides in water for aquaculture

No.	Parameter (µg/L)	Maximum Limits		Test Method
		Freshwater	Marine water	
1	Aldrin	0.01	1.3	FTZS 1853
2	Chlordane	0.01	0.09	FTZS 1853
3	Dieldrin	0.005	0.71	FTZS 1853
4.	Endrin	0.002	0.037	FTZS 1853
5	Heptachlor	0.005	0.053	FTZS1853
6	Toxaphene	0.002	0.21	FTZS 1853

Table 4: Limits for Bacteriological in water for aquaculture

No.	Parameter (cfu/100mL)	Limits		Test Method
		Freshwater	Marine water	
1.	Fecal coliform, max	-	70	-
2.	Total coliform, max	10,000	1,000	TZS 729

5.0 Sampling

The sample of water taken for testing shall represent the water proposed to be used for aquaculture. Sampling procedure shall be as per ISO 5667-4, 5667-6, 5667-9 and ISO 19458.

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