



加工廠水質之取樣 及 檢測方法

暉凱國際檢驗科技股份有限公司

FOOD SAFETY INSTITUTE INTERNATIONAL-ASIA PACIFIC OFFICE

F9-11, No. 189, Sec. 2, Keelung Rd., Taipei, Taiwan, ROC.

Tel: 886-2-55815988; Fax: 886-2-23789849

E-Mail: foodsafety@fsi-intl.com.tw

一、法規摘要重點：飲用水水質標準、符合性和官方監測計畫

二、適用範圍：本法適用於供人類食用水之管理

三、重點條文摘議

第2條 定義

本指令：

1. '供人類食用之水' 指：

(a) 全部水包括其初始狀態，或經處理後，打算作為飲用、烹飪、食品調配或國內其他使用目的之水，不管它的來源來自一個輸送系統，水灌車，瓶子或貨櫃；

(b)指所有使用於食品生產之製造、加工、保存或者銷售以供人類食用之產品或物質的用水，國家權責單位應確保使水質不會影響最終食品的健康安全性；

第4條 一般的義務

1.在不牴觸對其他會員國法規的情況下，會員國應採行必要措施以保證飲用水的安全和乾淨。為符合對本法之最低要求，飲用水如符合以下條件，則其應為安全和乾淨：

(a)沒有任何微生物和寄生動物，並且不含任何物質其含量足以造成健康之潛在危害，和

(b)符合Annex I, Part A 和B之最低要求；

第5條 品質標準

- 1.會員國應訂定飲用水Annex I 中之項目之管制標準。
- 2.依據本條第1 段所訂定之標準不應比Annex I 寬鬆，Annex I之C之項目之標準應被制訂定以做為監測之用，以符合本法第8條之規定。
- 3.會員國應針對未列於Annex I之C之項目之訂定標準以保護該國人民的健康。該標準應以第4(1)(a)條作為最低要求。

第7條 監測

1. 會員國應採必要措施以確保經常性的監測飲用水的品質，以檢查消費者所使用水符合本法，並符合本法第5條規定之項目。取樣之樣品須能代表該年度之水質之品質狀況。會員國應採取必要措施保證水的製造和運輸時階段消毒處理的效率經確認，並且來自消毒處理之副產品維持於可能的最低量且不影響消毒效果。
2. 為符合第1段，權責單位應建立飲用水之監測計畫。監測計畫應符合Annex II之最低標準。
3. 權責單位應由決定取樣點，且應符合Annex II相關的要求。
4. 歐盟各國可依第12條訂定監測指南。

5.(a)會員國應遵循Annex III 中分析項目之規格。

(b)如使用非Annex III中I之檢驗方法，需確保檢驗結果至少和該指定的方法所得結果為一樣可靠。會員國使用其他方法應提供的對等性訊息。

(c)Annex III中之2 和3項目之任何檢驗方法應符合前述要求。

第8條 補救行動和限制使用

1.會員國應保證依 第5條 訂定之項目如有不符合情況應立即展開調查，鑑別其原因。

會員國應訂定飲用水Annex I 中之項目之管制標準

ANNEX I

PARAMETERS AND PARAMETRIC VALUES

PART A

Microbiological parameters

Parameter	Parametric value (number/100 ml)
<i>Escherichia coli</i> (<i>E. coli</i>)	0
Enterococci	0

The following applies to water offered for sale in bottles or containers:

Parameter	Parametric value
<i>Escherichia coli</i> (<i>E. coli</i>)	0/250 ml
Enterococci 綠膿桿菌	0/250 ml
<i>Pseudomonas aeruginosa</i>	0/250 ml
Colony count 22 °C	100/ml
Colony count 37 °C	20/ml

PART B
Chemical parameters

Parameter	Parametric value	Unit	Notes
Acrylamide	0,10	$\mu\text{g/l}$	Note 1
Antimony	5,0	$\mu\text{g/l}$	
Arsenic	10	$\mu\text{g/l}$	
Benzene	1,0	$\mu\text{g/l}$	
Benzo(a)pyrene	0,010	$\mu\text{g/l}$	
Boron	1,0	mg/l	
Bromate	10	$\mu\text{g/l}$	Note 2
Cadmium	5,0	$\mu\text{g/l}$	
Chromium	50	$\mu\text{g/l}$	
Copper	2,0	mg/l	Note 3
Cyanide	50	$\mu\text{g/l}$	
1,2-dichloroethane	3,0	$\mu\text{g/l}$	
Epichlorohydrin	0,10	$\mu\text{g/l}$	Note 1
Fluoride	1,5	mg/l	
Lead	10	$\mu\text{g/l}$	Notes 3 and 4
Mercury	1,0	$\mu\text{g/l}$	
Nickel	20	$\mu\text{g/l}$	Note 3
Nitrate	50	mg/l	Note 5
Nitrite	0,50	mg/l	Note 5
Pesticides	0,10	$\mu\text{g/l}$	Notes 6 and 7
Pesticides — Total	0,50	$\mu\text{g/l}$	Notes 6 and 8
Polycyclic aromatic hydrocarbons	0,10	$\mu\text{g/l}$	Sum of concentrations of specified compounds; Note 9
Selenium	10	$\mu\text{g/l}$	
Tetrachloroethene and Trichloroethene	10	$\mu\text{g/l}$	Sum of concentrations of specified parameters
Trihalomethanes — Total	100	$\mu\text{g/l}$	Sum of concentrations of specified compounds; Note 10
Vinyl chloride	0,50	$\mu\text{g/l}$	Note 1

附註:

註1.項目之標準是指水中的剩餘單體濃度,並根據相應聚合體與水接觸後所能釋放出的最大量計算得。

註2.如果可能,在不影響消毒效果的前提下,成員國應盡力降低該值。

註3.該值適用於由用戶水嘴處所取水樣,且水樣應能代表用戶一周用水的平均水質.成員國必須考慮到可能會影響人體健康的峰值出現情況。

註4.該指令生效後5-15年,鉛的參數值為 $25 \mu\text{g/L}$ 。

註5. 成員國應確保 $[硝酸根濃度]/50 + [亞硝酸根濃度]/3 \leq 1$, 方括號中為以mg/L為單位計的硝酸根和亞硝酸根濃度, 且出廠水亞硝酸鹽含量要小於0.1mg/L。

註6. 農藥是指: 有機殺虫劑、有機除草劑、有機殺菌劑、有機殺線虫劑、有機殺蟎劑、有機除藻劑、有機殺鼠劑、有機殺粘菌和相關產品及其代謝副產物、降解和反應產物。

註7. 參數值適用於每種農藥. 對艾氏劑、狄氏劑、七氯和環氧七氯, 參數值為 $0.030 \mu\text{g/L}$.

註8. 農藥總量是指所有能檢測出和定量的單項農藥的總和。

註9.具體的化合物包括：苯並[b]呋喃、苯並[k]呋喃、苯並[g,h,i]芘、節並[1,2,,-cd]芘。

註10.如果可能，在不影響消毒效果的前提下，成員國應盡力降低下列化合物值：氯仿、溴仿、二溴一氯甲烷和一溴二氯甲烷該指令生效後5-15年，總三鹵甲烷的參數值為 $150 \mu\text{g/L}$ 。

PART C

Indicator parameters

Parameter	Parametric value	Unit	Notes
Aluminium	200	$\mu\text{g/l}$	
Ammonium	0,50	mg/l	
Chloride	250	mg/l	Note 1
<i>Clostridium perfringens</i> (including spores)	0	number/100 ml	Note 2
Colour	Acceptable to consumers and no abnormal change		
Conductivity	2 500	$\mu\text{S cm}^{-1}$ at 20 °C	Note 1
Hydrogen ion concentration	$\geq 6,5$ and $\leq 9,5$	pH units	Notes 1 and 3
Iron	200	$\mu\text{g/l}$	
Manganese	50	$\mu\text{g/l}$	
Odour	Acceptable to consumers and no abnormal change		
Oxidisability	5,0	mg/l O_2	Note 4
Sulphate	250	mg/l	Note 1
Sodium	200	mg/l	
Taste	Acceptable to consumers and no abnormal change		
Colony count 22°	No abnormal change		
Coliform bacteria	0	number/100 ml	Note 5
Total organic carbon (TOC)	No abnormal change		Note 6
Turbidity	Acceptable to consumers and no abnormal change		Note 7

RADIOACTIVITY

Parameter	Parametric value	Unit	Notes
Tritium	100	Bq/l	Notes 8 and 10
Total indicative dose	0,10	mSv/year	Notes 9 and 10

附註：

註1.不應具有腐蝕性。

註2.如果原水不是來自地表水或沒有受地表水影響，則不需要測定該參數。

註3.若為瓶裝或桶裝的靜止水，最小值可降至4.5pH單位，若為瓶裝或桶裝水，因其天然富含或人工充入二氧化碳，最小值可降至更低。

註4.如果測定TOC參數值，則不需要測定該值。

註5.對瓶裝或桶裝的水，單位為個/250mL。

註6.對於供水量小於是10000m³/d的水廠，不需要測定該值。

註7.對地表水處理廠，成員國應盡力保證出廠水的濁度不超過1.0NTU。

註8.監測頻率見 Annex II.

註9:除了 tritium, potassium -40, radon and radon decay 之外，監測頻率和方法見Annex II.

註10:

- 1.附註8所提之監測頻率，和註9所提之監測頻率、方法和 Annex II 之最相關地點監測點，應依第12條執行。
- 2.會員國並未被要求監測飲用水之氚或放射性以訂定可被接受的指示劑量，可依其他執行之監測，氚或計算所得總指示劑量應是否低於表準值之狀況，應與European Commission 溝通其決定和其執行之監測結果。

附加II: 監控

表A .分析項目

1. 檢查監控(Check Monitoring)

檢查監控目的旨在提供飲用水例行之**官能**、**微生物**的品質訊息，並提供飲用水處理效率的訊息(特別是指其消毒作用)，以確定飲用水是否符合本法規定。

下列項目為檢查監控對象。會員國可以依其適當性，增加其他項目。

- **Aluminium (Note 1)**
- **Ammonium**
- **Colour**
- **Conductivity**
- **Clostridium perfringens (including spores) (Note 2)**
- **Escherichia coli (E. coli)**
- **Hydrogen ion concentration**
- **Iron (Note 1)**
- **Nitrite (Note 3)**
- **Odour**
- **Pseudomonas aeruginosa (Note 4)**
- **Taste**
- **Colony count 22 °C and 37 °C (Note 4)**
- **Coliform bacteria**
- **Turbidity**



Note 1: Necessary only when used as flocculant (*).

Note 2: Necessary only if the water originates from or is influenced by surface water (*).

Note 3: Necessary only when chloramination is used as a disinfectant (*).

Note 4: Necessary only in the case of water offered for sale in bottles or containers. (*) In all other cases, the parameters are in the list for audit monitoring.


2.稽核監控(Audit monitoring)

稽核監控目的旨在提供飲用水是否本法管制項目之標準。第5條 (2)和(3)之項目需列入稽核監測，除非權責單位經一段期間判定某項目不可能導致風險。本段落不適用於放射性物質，放射性物質應依Annex I之C之8，9 和10之規定，在依第12條之規定執行。

表B1 Minimum frequency of sampling and analyses for water intended for human consumption supplied from a distribution network or from a tanker or used in a food-production undertaking

會員國取樣地點應依Article 6(1)以確保供人飲用水符合規定。然而會員國應於供水區域之輸水管路樣執行要項之檢測。

Volume of water distributed or produced each day within a supply zone (Notes 1 and 2) m ³	Check monitoring number of samples per year (Notes 3, 4 and 5)	Audit monitoring number of samples per year (Notes 3 and 5)
≤ 100	(Note 6)	(Note 6)
> 100 ≤ 1 000	4	1
> 1 000 ≤ 10 000	4 + 3 for each 1 000 m ³ /d and part thereof of the total volume	1 + 1 for each 3 300 m ³ /d and part thereof of the total volume
> 10 000 ≤ 100 000		3 + 1 for each 10 000 m ³ /d and part thereof of the total volume
> 100 000		10 + 1 for each 25 000 m ³ /d and part thereof of the total volume



Note 1: A supply zone is a geographically defined area within which water intended for human consumption comes from one or more sources and within which water quality may be considered as being approximately uniform.

Note 2: The volumes are calculated as averages taken over a calendar year. A Member State may use the number of inhabitants in a supply zone instead of the volume of water to determine the minimum frequency, assuming a water consumption of 200 l/day/capita.

Note 3: In the event of intermittent short-term supply the monitoring frequency of water distributed by tankers is to be decided by the Member State concerned.

Note 4: For the different parameters in Annex I, a Member State may reduce the number of samples specified in the table if:

- (a) the values of the results obtained from samples taken during a period of at least two successive years are constant and significantly better than the limits laid down in Annex I, and
- (b) no factor is likely to cause a deterioration of the quality of the water.

The lowest frequency applied must not be less than 50 % of the number of samples specified in the table except in the particular case of note 6.

Note 5: As far as possible, the number of samples should be distributed equally in time and location.

Note 6: The frequency is to be decided by the Member State concerned.

TABLE B2. Minimum frequency of sampling and analysis for water put into bottles or containers intended for sale—
略(無關)

ANNEX III: SPECIFICATIONS FOR THE ANALYSIS OF PARAMETERS

Each Member State must ensure that any laboratory at samples are analysed has a system of analytical quality control that is subject from time to time to checking by a person who is not under the control of the laboratory and who is approved by the competent authority for that purpose.

1. PARAMETERS FOR WHICH METHODS OF ANALYSIS ARE SPECIFIED

The following principles for methods of microbiological parameters are given either for reference whenever a CEN/ISO method is given or for guidance, pending the possible future adoption, in accordance with the procedure laid down in Article 12, of further CEN/ISO international methods for these parameters. Member States may use alternative methods, providing the provisions of Article 7(5) are met.

Coliform bacteria and Escherichia coli (E. coli)	(ISO 9308-1)
Enterococci	(ISO 7899-2)
Pseudomonas aeruginosa	8 pr EN ISO 12780)
Enumeration of culturable microorganisms	Colony count 22 ° C (prEN ISO 6222)
Enumeration of culturable microorganisms	Colony count 37 ° C (prEN ISO 6222)
Clostridium perfringens (including spores)	Membrane filtration followed by anaerobic incubation of the membrane on m-CP agar at 44 ± 1 ° C for 21 ± 3 hours. Count opaque yellow colonies that turn pink or red after exposure to ammonium hydroxide vapours for 20 to 30 seconds.

Note 1: The composition of m-CP agar is:

Basal medium		
	Tryptose	30g
	Yeast extract	20g
	Sucrose	5g
	L-cysteine hydrochloride	1g
	MgSO ₄ · 7H ₂ O	0.1g
	Bromocresol purple	40mp
	Agar	5g
	Water	1000 ml

Dissolve the ingredients of the basal medium, adjust pH to 7,6 and autoclave at 121 °C for 15 minutes.


Allow the medium to cool and add:

	D-cycloserine	400 mg
	Polymyxine-B sulphate	25 mg
	Indoxyl- β -D-glucoside to be dissolved in 8 ml sterile water before addition	60 mg
	Filter — sterilised 0,5% phenolphthalein diphosphate solution	20 ml
	Filter — sterilised 4,5 % FeCl ₃ · 6H ₂ O	2 ml

2. PARAMETERS FOR WHICH PERFORMANCE CHARACTERISTICS ARE SPECIFIED

2.1. For the following parameters, the specified performance characteristics are that the method of analysis used must, as a minimum, be capable of measuring concentrations equal to the parametric value with a trueness, precision and limit of detection specified.

Whatever the sensitivity of the method of analysis used, the result must be expressed using at least the same number of decimals as for the parametric value considered in Annex I, Parts B and C.



Note 1 (1*): Trueness is the systematic error and is the difference between the mean value of the large number of repeated measurements and the true value.

Note 2 (2*): Precision is the random error and is usually expressed as the standard deviation (within and between batch) of the spread of results about the mean.

Acceptable precision is twice the relative standard deviation.

Note 3: Limit of detection is either:

- three times the relative within batch standard deviation of a natural sample containing a low concentration of the parameter, or



- five times the relative within batch standard deviation of a blank sample.

Note 4: The method should determine total cyanide in all forms.

Note 5: Oxidation should be carried out for 10 minutes at 100 °C under acid conditions using permanganate.

Note 6: The performance characteristics apply to each individual pesticide and will depend on the pesticide concerned. The limit of detection may not be achievable for all pesticides at present, but Member States should strive to achieve this standard.

Note 7: The performance characteristics apply to the individual substances specified at 25 % of the parametric value in [Annex I](#).

Note 8: The performance characteristics apply to the individual substances specified at 50 % of the parametric value in [Annex I](#).

3. PARAMETERS FOR WHICH NO METHOD OF ANALYSIS IS SPECIFIED


Colour

Odour

Taste

Total organic carbon

Turbidity (Note 1)




Note 1: For turbidity monitoring in treated surface water the specified performance characteristics are that the method of analysis used must, as a minimum, be capable of measuring concentrations equal to the parametric value with a trueness of 25 %, precision of 25 % and a 25 % limit of detection.

Name ↴	Address ↴	ACCREDITED ISO 17025 ↴ Yes/No (1) ↴	TESTS ALSO samples from <u>FBOs</u> own-checks Yes/No ↴	ANALYSIS PERFORMED																	
				Fishery products												Drinking water					
				TVB-N ↴	TMA ↴	Biotoxins ↴	Lead (Pb) ↴	Cadmium (Cd) ↴	Mercury (Hg) ↴	Dioxins ↴	PAH ↴	Histamine ↴	Listeria monocytogenes ↴	Salmonella ↴	Escherichia coli ↴	Coagulase + staphylococci ↴	Other analyses (2) ↴	Escherichia coli ↴	Enterococci ↴	Clostridium perfringens ↴	Other analyses (2) ↴
				(2) ↴	↴	↴	Regulation 1831/2003 ↴				Regulation 2073/2005 ↴				Directive 98/83 ↴						
↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴		
↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴		
↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴		
↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴		
↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴		
↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴		
↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴		
↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴		
↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴	↴		

(1) Specify, if the laboratory is not yet accredited, when the laboratory initiated the accreditation process and quality control schemes for the analyses it conducts...

(2) Commission Regulation (EC) N° 2074/2005 of 5 December 2005 laying down implementing measures...

(3) Please list other analyses carried out by the laboratory...



- Q & A