

- i) refer to the prescribed concentrations and values set out in the Industrial and Municipal Wastewater Standards;
- ii) assess site compliance against this criteria;
- iii) specify the appropriate risk based mitigating actions with reference to corrective and preventative action; and
- iv) where appropriate launch other enforcement action or prosecution.

c) Enforcement and prosecutions will be determined by the conditions set out in the General Environmental Regulations.

d) Where the contravention of ambient standards is due to cumulative impact of local discharges, but without infringement of discharge standards the Competent Agency shall take the following actions:

- i) conduct a study into the assimilative capacity of the local environment set against the context of current and future use criteria; and
- ii) revise and enforce local discharge standards according to these findings in order to protect human health and the environment as set out under the General Environmental Regulation.

#### 4) Background conditions

a) Where the existing background conditions are considered of better quality than these standards, those conditions must be at least maintained as a minimum requirement.

b) The existing uses of water as defined in Article III should be maintained or protected unless authorised by the Competent Agency.

c) The Competent Agency may designate zones where an exceedance of threshold values for a given pollutant is attributable to natural causes. In such cases the Competent Agency will undertake no further action.

#### 5) Sediment quality

a) Where appropriate, bottom sediments shall be substantially free of pollutants that:

- i) Unduly affect the composition of bottom fauna;
- ii) are known to be bio-accumulative and harmful in food chains;

- iii) are activated when disturbed by natural or human activities such as dredging;
- iv) unduly affect the physical or chemical nature of the sediment; or
- v) interfere with the propagation of habitats or shellfish, fish and other wildlife.

#### 6) Mixing zones

a) The operator or facility will establish zones of influence from discharges which are exempt from these standards but are however, subject to the requirements of the industrial and municipal wastewater standards.

b) The following requirements apply in relation to a mixing zone in a receiving water body:

- i) the zone of influence or mixing zone shall be designed in order to minimise the impact on the environment, however the absolute maximum size of a mixing zone shall be determined on a case by case basis using the methodology in Appendix C and limited to a maximum 100m radius;
- ii) acutely toxic conditions should not be reached within a mixing zone; where tested, Methods must be in accordance with 40 CFR Part 136 Guidelines Establishing Test Procedures for the Analysis of Pollutants; Whole Effluent Toxicity Test Methods; USEPA.
- iii) mixing zones should not impinge on sensitive areas, such as coral reefs, recreational areas or important spawning or nursery areas for aquatic organisms;
- iv) neighbouring mixing zones should not merge or overlap;
- v) no mixing zone should impinge the mean low water spring (MLWS) shoreline; and
- vi) materials should not be discharged that settle and cause harmful or objectionable deposits; the growth of undesirable aquatic life; or result in the dominance of nuisance species.
- vii) Alternative mixing zone areas may on a case by case basis be agreed by the Competent Agency to represent areas that have been designated as sites of significant economic importance (SSEI).
- viii) An application for a SSEI variation must be made using the official form in Appendix D and will be supported by evidence justifying the award of a temporary permit. The significance of this evidence will be determined by the Competent Agency only.

c) Should an operator determine that the methodology specified in Appendix C is technically unachievable at a specific locality, they must produce a study to confirm the best achievable mixing zone dimensions available using BAT.

d) The method for carrying out this assessment must be approved in advance by the Competent Agency. This study must also make an assessment of the impact the new mixing zone will have upon the environment and be submitted to the Competent Agency.

ii) is of special character or exemption,

the Competent Agency shall update their central usage records and amend their monitoring and analysis programme accordingly.

d) The Competent Agency is obligated to verify the usage zone classification every 10 years. Verification activities will vary depending on the development of the local area during the intermittent time and changes in environmental conditions. In doing this the Competent Agency shall show due diligence in the verification process.

**Article III Classification of water bodies**

**1) Water body classification**

a) The classification a waterbody receives determines the environmental quality objectives (EQOs) that apply to that water body (criteria for EQOs specified in Appendix B.

b) All water bodies must be classified either as fresh surface water, groundwater, or coastal water. The definition of each of these water-bodies is set out in Appendix A.

c) All coastal water shall be sub-divided into the following usage related classifications by the Competent Agency (as set out in Appendix A) for the purposes of monitoring ambient water quality:

- i) marine;
- ii) high value; or
- iii) industrial.

d) Coastal waters can be further classified into being primary or secondary recreational zones if they meet the criteria, also set out in Appendix A.

**2) Changes in classifications**

a) The Competent Agency can amend usage zones following their initial classification at any time.

b) It is the responsibility of the Competent Agency to make any changes to usage zone classifications known to affected persons, facilities and operators so that the classification protects those sensitive receptors affected.

c) Where the Competent Agency is of the opinion that any coastal area of the Kingdom of Saudi Arabia:

- i) is of special interest by reason of its flora, fauna or geological or physiographical features; or

**Article IV – Monitoring, enforcement and penalties**

**1) Sampling and monitoring requirements**

a) National ambient water quality monitoring is the responsibility of the Competent Agency and must be carried out in such a manner as to assess compliance with the water quality objectives set out in appendix B.

b) The national monitoring programme carried out by the Competent Agency and will include as a minimum:

- i) parameters to be monitored;
- ii) sampling locations and frequency;
- iii) sampling methods and equipment;
- iv) schedules for sampling;
- v) methods for quality assurance and validation of sampling results;
- vi) requirements for checking and interpreting results;
- vii) responsibilities and necessary qualifications of staff;
- viii) requirements for documentation and management of records;
- ix) data be recorded and sorted; and
- x) detailed requirements for reporting and communicating results.

b) The analytical testing methods for determining compliance with the ambient water quality standards shall be in accordance with the most recent edition of the Standard Methods for the Examination of Water and Wastewater published by the American Public Health Association (APHA).

## Appendix A – Classification of water bodies

**A1** – According to the requirements of Article III 2, all water bodies must be classified according to the type of water and use. This appendix sets out the criteria for classifying usage zones.

Classification	Sub-division	Code	Definition
Groundwater	-	A	Water located beneath the ground surface in soil pore spaces and in the fractures of geologic formations.
Fresh surface water	-	B	This includes all fresh waters on the ground and includes water within rivers, streams, lakes, ponds, wetlands, marshes, wadis and man made reservoirs.
Coastal water	Marine	C1	Coastal waters are those that are under the jurisdiction of KSA (the territorial coastal waters being 12 international nautical miles (22.2 kilometres) of the shoreline). The sub-division 'marine' is the default when the coastal water body does not meet the criteria for 'high-value' or 'industrial', detailed below.
Coastal water	High value	C2	Areas of coastal water shall be classified as 'high value' if they are designated as locally, nationally or internationally protected areas by any Concerned Agency (this includes but is not limited to the Competent Agency, ROPME, NCWCD and PERGSA).
Coastal water	Industrial	C3	Water bodies shall be classified as industrial if they are adjacent to terrestrial zones that are classified as industrial through local or national planning regulation. The extent of the aquatic environment classified as industrial will represent a seaward extension of the terrestrial boundary provided that it does not impinge upon high areas classified as C1 or C2. Furthermore, industrial ambient conditions will extend no more than a 500 meter radius from the edge of any mixing zone.

## Appendix C – Calculation of mixing zones<sup>4</sup> in the Red Sea and Arabian Gulf

### C1 – Red Sea and Gulf mixing zones [screening model]

$SD_{ave}$  = Horizontal extent of mixing zone

Where:

$D_{ave}$  = average water depth at outfall location<sup>5 6</sup>

S = refer to table D1.

**Table C1 – Red Sea S values**

S	Example of habitat/area type
2	High-value area
5	Marine classified area
8	Industrially classified area

**Table C2 – Arabian Gulf S Values<sup>7</sup>**

S	Example of habitat/area type
4	High-value area
8	Marine classified area
12	Industrially classified area

#### Notes:

1. This method represents the basic screening model for defining the maximum horizontal extent of a mixing zone.
2. Where modelling shows that the maximum extent of the mixing zone is unachievable, the Competent Agency must be consulted for approval on a case by case basis.
3. The maximum horizontal extent of the mixing zone radius will be 100m at any time.

<sup>4</sup> Method adapted from Jirka et al (2004). Published by the European Water Association.

<sup>5</sup> Average depth applies where diffusion technology is utilised for discharge and must be measured at 10m increments along the length of the diffusion apparatus. Otherwise the depth at the end of the outfall applies.

<sup>6</sup> For the gulf a correction factor of +10 is applied to depth to take account of local bathymetry.

<sup>7</sup> These values are adjusted to accommodate for the conditions in the Arabian Gulf (i.e. shallow waters)

**Table C3 – A look up table showing the radius of a mixing zone for given values of S and  $D_{ave}$  for the Red Sea and Gulf of Arabia**

Red Sea Depth (m)	2	5	8	Arabian Gulf Depth (m)	4	8	12
	Mixing zone radius <sup>8</sup>				Mixing zone radius		
<b>5 or less</b>	10	25	40	<b>5 or less</b>	20	40	60
<b>6</b>	12	30	48	<b>6</b>	24	48	72
<b>7</b>	14	35	56	<b>7</b>	28	56	84
<b>8</b>	16	40	64	<b>8</b>	32	64	96
<b>9</b>	18	45	72	<b>9</b>	36	72	<b>100</b>
<b>10</b>	20	50	80	<b>10</b>	40	80	
<b>11</b>	22	55	88	<b>11</b>	44	88	
<b>12</b>	24	60	96	<b>12</b>	48	96	
<b>13</b>	26	65	<b>100</b>	<b>13</b>	52	<b>100</b>	
<b>14</b>	28	70		<b>14</b>	56		
<b>15</b>	30	75		<b>15</b>	60		
<b>16</b>	32	80		<b>16</b>	64		
<b>17</b>	34	85		<b>17</b>	68		
<b>18</b>	36	90		<b>18</b>	72		
<b>19</b>	38	95		<b>19</b>	76		
<b>20</b>	40	<b>100</b>		<b>20</b>	80		
<b>21</b>	42			<b>21</b>	84		
<b>22</b>	44			<b>22</b>	88		
<b>23</b>	46			<b>23</b>	92		
<b>24</b>	48			<b>24</b>	96		
<b>25</b>	50			<b>25</b>	<b>100</b>		
<b>26</b>	52			<b>26</b>			
<b>27</b>	54			<b>27</b>			
<b>28</b>	56			<b>28</b>			
<b>29</b>	58			<b>29</b>			
<b>30</b>	60			<b>30</b>			
<b>31</b>	62			<b>31</b>			
<b>32</b>	64			<b>32</b>			
<b>33</b>	66			<b>33</b>			
<b>34</b>	68			<b>34</b>			
<b>35</b>	70			<b>35</b>			
<b>36</b>	72			<b>36</b>			
<b>37</b>	74			<b>37</b>			
<b>38</b>	76			<b>38</b>			
<b>39</b>	78			<b>39</b>			
<b>40</b>	80			<b>40</b>			
<b>41</b>	82			<b>41</b>			
<b>42</b>	84			<b>42</b>			
<b>43</b>	86			<b>43</b>			
<b>44</b>	88			<b>44</b>			
<b>45</b>	90			<b>45</b>			
<b>46</b>	92			<b>46</b>			
<b>47</b>	94			<b>47</b>			
<b>48</b>	96			<b>48</b>			
<b>49</b>	98			<b>49</b>			
<b>50</b>	<b>100</b>			<b>50</b>			

<sup>8</sup> Horizontal radius