

Poseidon – Water Quality Classes Tables

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Section 1: Typical Wastewater Quality (Input) That Is Intended for Reuse

The table below indicates a list of typical wastewater qualities for several types of wastewater to be reused. The user can either manually define the quality of the “input flow” or choose from the list below. The value “-1” means no data available, not applicable, or not relevant.

Table 1: Typical Wastewater Quality (Input) That Is Intended for Reuse

Wastewater qualities of potential input	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Reference / Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	

Municipal Wastewater

Wastewater qualities of potential input	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Reference / Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100 ml	CFU/ 100 ml	mg/L	mg N/L	mg/L	PFU/ 100 ml	
Typical untreated domestic wastewater	100	210	190	430	40	7	10 ⁴ – 10 ⁵	10 ⁷ – 10 ⁸	720	0	140	10 ¹ – 10 ⁴	(Asano, Burton, & Leverenz, 2007) <i>Typical composition of untreated domestic wastewater. Note: there is no typical wastewater; values should only be used as guide!</i> <i>Data presented are for medium-strengths wastewater based on average flow of 460 L/cap*day and include constituents added by commercial institutional, and industrial sources.</i>
Untreated domestic wastewater (<i>ranges</i>)	–1	120– 400	110– 350	250– 800	20–70	4–12	10 ³ – 10 ⁷	10 ⁶ – 10 ⁹	270– 860	0- trace	80–260	–1	(Asano et al., 2007)
Primary effluent	88	131	149	–1	–1	5.1	–1	–1	–1	0.1	72	–1	<i>Constituents remaining after primary treatment. Primary treatment consisted of a rotary drum screen , followed by disk screens</i>
Secondary effluent- water hyacinths	14	9.8	13 (<i>CBOD value</i>)	–1	–1	3.4	–1	–1	–1	1.4	14	–1	(Asano et al., 2007) / <i>Constituents remaining after secondary treatment. Secondary treatment was with water hyacinths</i>
Secondary effluent- CAS	2–15	5–25	5.25	40–80	15–35	4–10	–1	10 ⁴ – 10 ⁵	500– 700	10–30	10–40	10 ¹ – 10 ³	(Asano et al., 2007) / <i>Constituents remaining after secondary treatment. Secondary treatment was conventional activated sludge (CAS).</i>
Secondary effluent- CAS + filtration	0.5–4	2–8	<5–20	30–70	15–35	4–8	–1	10 ³ – 10 ⁵	500– 700	10–30	8–30	10 ¹ – 10 ³	(Asano et al., 2007) / <i>Constituents remaining after secondary treatment.</i>

Wastewater qualities of potential input	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Reference / Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	
													<i>Secondary treatment was conventional activated sludge (CAS) with filtration</i>
Secondary effluent-activated sludge + BNR	2–8	5–20	5–15	20–40	3–8	1–2	–1	10 ⁴ –10 ⁵	500–700	2–8	8–20	10 ¹ –10 ³	<i>(Asano et al., 2007) / Constituents remaining after secondary treatment. Secondary treatment was activated sludge with biological nutrient removal (BNR) for the removal of nitrogen and phosphorus</i>
Secondary effluent-activated sludge + BNR+ filtration	0.3–2	1–4	1–5	20–30	2–5	2	–1	10 ⁴ –10 ⁵	500–700	1–5	1–5	10 ¹ –10 ³	<i>(Asano et al., 2007) / Constituents remaining after secondary treatment. Secondary treatment was activated sludge with biological nutrient removal (for the removal of nitrogen and phosphorus) and filtration</i>
Secondary effluent-membrane bioreactor	1	2	<1–5	<10–30	<10	<0.3–5	–1	<100	500–700	10	0.5–5	10 ⁰ –10 ³	<i>(Asano et al., 2007) / Constituents remaining after secondary treatment. Secondary treatment was membrane bioreactor</i>
Secondary effluent-activated sludge + MF + RO	0.01–1	1	1	2–10	1	0.5	–1	0	5–40	1	0.1–1	0	<i>(Asano et al., 2007) / Constituents remaining after secondary treatment. Secondary treatment was activated sludge with microfiltration (MF) and reverse osmosis (RO).</i>
Tertiary effluent	0.5	1.3	4.3 (CBOD value)	–1	–1	0.1	–1	–1	–1	1.7	7.1	–1	<i>(Asano et al., 2007) / Constituents remaining after tertiary treatment. Tertiary treatment consisted of lime precipitation and depth filtration</i>

Wastewater qualities of potential input	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Reference / Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	
AWT effluent	0.27	-1	-1	-1	-1	0.1	-1	-1	-1	0.7	0.6	-1	(Asano et al., 2007) / Constituents remaining after advanced wastewater treatment (AWT).

Industrial Wastewater

Textile industry:

Textile Industry-India	-1	-1	713 (500–1,010)	2125 (1,600–3,200)	-1	-1	-1	-1	5,738 (4,040–7,500)	354 (120–627)	-1	-1	(Hussain, Hussain, & Arif, 2004) / Average Values and (ranges) from six Indian textile industries
Textile Industry-Nigeria	-1	400 (49–1,200)	332 (163–645)	1,891 (1,067–2,430)	-1	-1	-1	-1	1,181 (250–2,200)	4.4 (Not detectable – 7.97)	-1	-1	(Yusuff & Sonibare, 2004) / Average Values and (ranges) from five Nigerian textile mills

Dairy industry:

Dairy- Industry India	15–30	250–600	350–600	1,500–3,000	-1	-1	-1	-1	800–1,200	-1	-1	-1	(Sarkar, Chakrabarti, Vijaykumar, & Kale, 2006) / Characteristics of raw dairy wastewater of A.P. Dairy in Hyderabad, India
Dairy Industry-Cheese	-1	500–2,500 (Value for SS)	588–5,000	1,000–7,500	830 (Value for TKN)	280	-1	-1	-1	-1	-1	-1	(Demirel, Yenigun, & Onay, 2017) / Ranges or mean values reported from 3 cheese industry examples

Wastewater qualities of potential input	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Reference / Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	
Dairy Industry- Cheese whey	-1	1,780 (Value for SS)	-1	61,000/68,814	980/1,462 (Value for TKN)	510/379	-1	-1	-1	-1	-1	-1	(Demirel et al., 2017) / Ranges or mean values reported from 2 cheese whey industry examples
Dairy Industry- Mixed processing	-1	340–1,730/12,500 (Value for SS)	-1	1,150–9,200/63,100	14–272 (Value for TKN)	8–68	-1	-1	-1	-1	-1	-1	(Demirel et al., 2017) / Ranges or mean values reported from 2 mixed dairy industry examples
Pulp and Paper industry:													
Paper mill	-1	800 (Value for SS)	1,600	5,020	11	0.6	-1	-1	-1	-1	-1	-1	(Pokhrel & Viraraghavan, 2017) / Typical characteristics of wastewater at paper mill
Brewery industry													
Brewery (Beer) Typical ranges	-1	200–1,000	1,200–3,600	2,000–6,000	25–80	10–50	-1	-1	-1	-1	-1	-1	(Oreopoulou et al., 2007)
Winery Production: 3000 m ³ /year	-1	1,060	8,100	14,150	48.2	5.5	-1	-1	-1	-1	-1	-1	(Oreopoulou et al., 2007) / Example of one wine producing industry

Wastewater qualities of potential input	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Reference / Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	
Winery <i>Production: 6000 m³/year</i>	-1	1,960–5,800	5,540–11,340	9,240–17,900	74–260	16–68	-1	-1	-1	-1	-1	-1	(Oreopoulou et al., 2007) / Example of one wine producing industry

Notes: "Turb" stands for "Turbidity", "TSS" stands for "Total suspended solids", "BOD" stands for "Biological oxygen demand", "COD" stands for "Chemical oxygen demand", "TN" stands for "Total nitrogen", "TP" stands for "Total phosphorous", "FC" stands for "Fecal coliform", "TC" stands for "Total coliform", "TDS" stands for "Total dissolved solids", "TOC" stands for "Total organic carbon".

Section 2: Recommended Water Quality Based on Guidelines

The table below compiles water quality standards for different end-uses based on different international guidelines. The value "-1" signifies no limit specified or no data available.

Table 2: Recommended Water Quality Based on Guidelines

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	eggs/L	

United States Environmental Protection Agency (US EPA) guidelines, 2012

Many US states have rules, regulations or guidelines for a wide range of reclaimed water end uses and prescribe different requirements for different reuses. Minimum suggested regulatory guidelines are presented as follows. Guidelines refer to the use of treated municipal wastewater (reclaimed water).

Remarks: Recommended coliform limits are median values determined from the bacteriological results of the last 7 days for which analyses have been completed. The number of FC organisms should not exceed 800 CFU/100 ml in any sample.

Additional standards included for all reuse categories: pH: 6.0–9.0; Minimum CL₂ residual: 1 mg/L

EPA: Urban Reuse-unrestricted Table 4.4, p.4–9	2	-1	10	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	<i>Definition:</i> Use of reclaimed water in non-potable applications in municipal settings where public access is not restricted. <i>Treatment:</i> Secondary, filtration, disinfection
EPA: Urban Reuse-restricted Table 4.4, p.4–9	-1	30	30	-1	-1	-1	200	-1	-1	-1	-1	-1	-1	<i>Definition:</i> Use of reclaimed water in non-potable applications in municipal settings where public access is restricted by physical/institutional barriers <i>Treatment:</i> Secondary, disinfection
EPA: Agricultural Reuse-Food Crops Table 4.4, p.4–9	2	-1	10	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	<i>Definition:</i> Use of reclaimed water for surface or spray irrigation of food crops eaten raw <i>Treatment:</i> Secondary, filtration, disinfection

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	eggs/L	
EPA: Agricultural Reuse- Processed food crops and Non-food crops Table 4.4, p.4–9	-1	30	30	-1	-1	-1	200	-1	-1	-1	-1	-1	-1	<i>Definition: Use of reclaimed water for surface or spray irrigation of food crops processed prior to consumption and non-food crops like fodder, fiber etc.</i> <i>Treatment: Secondary, disinfection</i>
EPA: Impoundments- unrestricted Table 4.4, p.4–10	2	-1	10	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	<i>Definition: Use of reclaimed water in an impoundment in which no limitations are imposed on body contact</i> <i>Treatment: Secondary, filtration, disinfection</i>
EPA: Impoundments- restricted Table 4.4, p.4–10	-1	30	30	-1	-1	-1	200	-1	-1	-1	-1	-1	-1	<i>Definition: Use of reclaimed water in an impoundment where bod-contact is restricted</i> <i>Treatment: Secondary, disinfection</i>
EPA: Environmental Reuse Table 4.4, p.4–10	-1	30	30	-1	-1	-1	200	-1	-1	-1	-1	-1	-1	<i>Definition: Use of reclaimed water to create wetlands, enhance natural wetlands or sustain stream flows</i> <i>Treatment: Variable, secondary, and disinfection</i>
EPA: Industrial Reuse- Once-through cooling	-1	30	30	-1	-1	-1	200	-1	-1	-1	-1	-1	-1	<i>Treatment: Secondary</i>
EPA: Industrial Reuse- Recirculating Cooling Towers Table 4.4, p.4_+10	-1	30	30	-1	-1	-1	200	-1	-1	-1	-1	-1	-1	<i>Treatment: Secondary, disinfection</i>
EPA: Groundwater Recharge- Indirect potable reuse	2	-1	-1	-1	-1	-1	0	-1	-1	-1	2	-1	-1	<i>Definition: Groundwater recharge by spreading into potable aquifers or by injection into potable aquifers and augmentation of surface water supply reservoirs</i>

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	eggs/L	
Table 4.4, p.4–11														<i>Treatment: Secondary, filtration, disinfection, advanced wastewater treatment or soil aquifer treatment</i>

Texas water reuse standards (Example indicated in US EPA guidelines, 2012)

Remarks: Recommended coliform limits are 30 days geometric mean values. The maximum of FC organisms in any samples is indicated in brackets.

Texas EPA: Urban Reuse-unrestricted Table 4.7, p.4–26	3	-1	5	-1	-1	-1	20 (75)	-1	-1	-1	-1	-1	-1	Add. Parameter: Enterococci: 4 CFU/100 mL (max. 9 CFU/100 mL)
Texas EPA: Urban Reuse-restricted Table 4.8, p.4–27	-1	-1	20	-1	-1	-1	200 (800)	-1	-1	-1	-1	-1	-1	BOD: 20 mg/L without pond; 30 mg/L with pond Add. Parameter: Enterococci: 35 CFU/100 mL (max. 89 CFU/100 mL)
Texas EPA: Agricultural Reuse-Food Crops Table 4.9, p.4–28	3	-1	5	-1	-1	-1	20 (75)	-1	-1	-1	-1	-1	-1	Add. Parameter: Enterococci: 4 CFU/100 mL (max. 9 CFU/100 mL)
Texas EPA: Agricultural Reuse-Processed food crops and Non-food crops Table 4.10, p.4–29	-1	-1	20	-1	-1	-1	200 (800)	-1	-1	-1	-1	-1	-1	BOD: 20 mg/L without pond; 30 mg/L with pond Add. Parameter: Enterococci: 35 CFU/100 mL (max. 89 CFU/100 mL)
Texas EPA: Impoundments-unrestricted Table 4.11, p.4–30	3	-1	5	-1	-1	-1	20 (75)	-1	-1	-1	-1	-1	-1	Add. Parameter: Enterococci: 4 CFU/100 mL (max. 9 CFU/100 mL)
Texas EPA: Impoundments-restricted	-1	-1	20	-1	-1	-1	200 (800)	-1	-1	-1	-1	-1	-1	BOD: 20 mg/L without pond; 30 mg/L with pond

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	eggs/L	
Table 4.12, p.4–31														Add. Parameter: Enterococci: 35 CFU/100 mL (max. 89 CFU/100 mL)
Texas EPA: Environmental Reuse Table 4.13, p.4–32	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	Not regulated
Texas EPA: Industrial Reuse- Recirculating Cooling Towers Table 4.14, p.4–33	-1	-1	20	-1	-1	-1	200 (800)	-1	-1	-1	-1	-1	-1	BOD: 20 mg/L without pond; 30 mg/L with pond Add. Parameter: Enterococci: 35 CFU/100 mL (max. 89 CFU/100 mL)
Texas EPA: Groundwater Recharge- Indirect potable reuse Table 4.16, p.4–35	3	-1	5	-1	-1	-1	20 (75)	-1	-1	-1	-1	-1	-1	Add. Parameter: Enterococci: 4 CFU/100 mL (max. 9 CFU/100 mL)

California water reuse standards (Example indicated in US EPA guidelines, 2012)

Remarks: Recommended coliform limits are median values determined from the bacteriological results of the last 7 days for which analyses have been completed. (Otherwise indicated in brackets.)

California EPA: Urban Reuse- unrestricted Table 4.7, p.4–26	2	-1	-1	-1	-1	-1	-1	2.2	-1	-1	-1	-1	-1	For media filters: 2 NTU (avg.)/10 NTU (max.) For membrane filters: 0.2 NTU (avg.)/0.5 NTU (max.) TC: 240/100 ml (max.)
California EPA: Urban Reuse-restricted Table 4.784, p.4–27	-1	-1	-1	-1	-1	-1	-1	23	-1	-1	-1	-1	-1	TC: 240/100 ml (max.)

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	eggs/L	
California EPA: Agricultural Reuse- <i>Food Crops</i> Table 4.9, p.4–28	2	-1	-1	-1	-1	-1	-1	2.2	-1	-1	-1	-1	-1	For media filters: 2 NTU (avg.)/10 NTU (max.) For membrane filters: 0.2 NTU (avg.)/0.5 NTU (max.) TC: 240/100 ml (max.)
California EPA: Agricultural Reuse- <i>Processed food crops and Non-food crops</i> Table 4.10, p.4–29	-1	-1	-1	-1	10	-1	-1	-1	-1	-1	-1	-1	-1	TC is not specified in the Californian standards.
California EPA: Impoundments- <i>unrestricted</i> Table 4.11, p.4–30	2	-1	-1	-1	-1	-1	-1	2.2	-1	-1	-1	-1	-1	For media filters: 2 NTU (avg.)/10 NTU (max.) For membrane filters: 0.2 NTU (avg.)/ 0.5 NTU (max.) TC: 240/100 ml (max.) Supplemental pathogen monitoring
California EPA: Impoundments- <i>restricted</i> Table 4.12, p.4–31	-1	-1	-1	-1	-1	-1	-1	2.2	-1	-1	-1	-1	-1	TC: 23/100 ml (not more than one sample exceeds this value in 30d)
California EPA: Environmental Reuse Table 4.13, p.4–32	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	Not regulated
California EPA: Industrial Reuse- <i>Once-through cooling</i> Table 4.14, p.4–33	2	-1	-1	-1	-1	-1	-1	2.2	-1	-1	-1	-1	-1	For media filters: 2 NTU (avg.)/10 NTU (max.) For membrane filters: 0.2 NTU (avg.)/0.5 NTU (max.) TC: 240/100 ml (max.)

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	eggs/L	
California EPA: Groundwater Recharge- <i>Indirect potable reuse</i> Table 4.16, p.4–35	2	-1	-1	-1	10 avg. of 4 consec. samples	-1	-1	2.2	-1	-1	0.5	-1	-1	For media filters: 2 NTU (avg.)/10 NTU (max.) For membrane filters: 0.2 NTU (avg.)/0.5 NTU (max.) TC: 240/100 ml (max.) Pathogen monitoring is not required but virus removal rates are prescribed by treatment requirements

World Health Organization (WHO) guidelines, 2006; Vol. 2–4

The WHO guidelines for the *safe use of wastewater, excreta and greywater* (presented in 4 volumes) are designed to protect the health of farmers (and their families), local communities and product consumers. Overly strict standards may not be suitable in developing countries. The guidelines propose maximum limits or maximum ranges for E.coli and helminths in wastewater and greywater for different reuse purposes that have been set to meet health based targets (i.e. not to exceed 10^{-6} DALY per person per year).

Remarks: Recommended standard for E.coli per 100 ml are arithmetic means and are indicated under the FC parameter in the table below. E.coli is approximately equivalent to 90% of the FCs.

WHO: Use of wastewater in agriculture-unrestricted Vol.2, Chapter 4.2, p.63–67	-1	-1	-1	-1	-1	-1	10^3 – 10^4	-1	-1	-1	-1	-1	1	<u>Definition:</u> Irrigation with wastewater of all agricultural crops <u>Standards for E.coli in CFU/100 mL:</u> Root crops: 10^3 ; Leaf crops: 10^4 ; Drip irrigation, high growing crops: 10^5
WHO: Use of wastewater in agriculture-restricted-highly mechanized irrigation Vol.2, Chapter 4.2, p.67–69	-1	-1	-1	-1	-1	-1	10^5	-1	-1	-1	-1	-1	1	<u>Definition:</u> Irrigation with wastewater of all agricultural crops except crops eaten unprocessed/raw (like lettuce). <u>Standards for E.coli in CFU/100 mL:</u> Labor-intensive irrigation: 10^4 ; High mechanized agriculture: 10^5 ; Drip irrigation, high growing crops: 10^5

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	eggs/L	
WHO: Use of wastewater in agriculture- <i>restricted-labor intensive irrigation</i> Vol.2, Chapter 4.2, p.67–69	-1	-1	-1	-1	-1	-1	10 ³ –10 ⁴	-1	-1	-1	-1	-1	1	<i>Definition: Irrigation of all agricultural crops except crops eaten unprocessed/raw (like lettuce).</i> <i>Standards for E.coli in CFU/100 mL:</i> <i>Labor-intensive irrigation: 10⁴ ; High mechanized agriculture: 10⁵</i>
WHO: Use of wastewater in aquaculture Vol.3, Table 4.1, p.41	-1	-1	-1	-1	-1	-1	10 ⁴ –10 ⁵	-1	-1	-1	-1	-1	1	<i>Standards for E.coli in CFU/100 mL:</i> <i>Consumers: 10⁵ ;Workers: 10⁴</i> <i>No trematode eggs detectable</i>
WHO: Use of grey water in agriculture- <i>unrestricted</i> Vol.4. Table 4.2, p.63	-1	-1	-1	-1	-1	-1	10 ³ –10 ⁴	-1	-1	-1	-1	-1	1	<i>Definition: Irrigation with grey water of all agricultural crops</i> <i>Standards for E.coli in CFU/100 mL:</i> <i>High growing crops or Drip irrigation: 10⁴</i>
WHO: Use of grey water in agriculture- <i>restricted</i> Vol.4. Table 4.2, p.63	-1	-1	-1	-1	-1	-1	10 ⁵	-1	-1	-1	-1	-1	1	<i>Definition: Irrigation with grey water of all agricultural crops except crops eaten unprocessed/raw (like lettuce).</i>

Standards for Water Reuse in Eastern Mediterranean Region (EMR), based on WHO guidelines 1989

Reference: A compendium of standards for wastewater reuse in the Eastern Mediterranean Region, 2006

The compendium provides an overview of the quality standards for the reuse of treated wastewater in countries of the Eastern Mediterranean Region. The WHO in collaboration with the Arab Fund for Economic and Social Development (AFESD) recommended guidelines for wastewater (Category A-C) and greywater (Category A-C) reuse for the Eastern Mediterranean Region in 2003. In addition, Jordanian Standards for wastewater reuse are listed below (JS:893/2002).

Wastewater: Category A <i>Unrestricted irrigation</i>	-1	-1	-1	-1	-1	-1	10 ³	-1	-1	-1	-1	-1	0	<i>Definition: Irrigation with wastewater of vegetable and salad crops eaten uncooked, sport fields, public parks</i>
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End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	eggs/L	
														<i>Irrigation technique: any</i> <i>Exposed group: Workers, consumers, public</i>
Wastewater: Category B <i>Restricted irrigation</i>	-1	-1	-1	-1	-1	-1	10 ³ / 10 ⁵	-1	-1	-1	-1	-1	0	<i>Definition: Irrigation with wastewater of cereal crops, industrial crops, fodder crops, pasture and trees</i> <i>Irrigation technique: spray or sprinkler (10⁵ E.coli CFU/mL); Flood or furrow (10³ E.coli CFU/mL)</i> <i>Exposed group: Workers, nearby communities</i>
Wastewater: Category C	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	<i>Definition: Localized irrigation with wastewater of crops in category B if exposure of workers and the public does not occur.</i> <i>Irrigation technique: Trickle, drip or bubbler</i> <i>Exposed group: None</i> <i>No water quality measures have to be met</i>
Greywater: Category A	-1	140	240	-1	-1	-1	10 ³	-1	-1	-1	-1	-1	-1	<i>Definition: Irrigation with greywater of ornamental fruit trees and fodder crops</i>
Greywater: Category B	-1	20	20	-1	-1	-1	200	-1	-1	-1	-1	-1	-1	<i>Definition: Irrigation with greywater of vegetables likely to be eaten uncooked.</i>
Greywater: Category C	-1	10	10	-1	-1	-1	10	-1	-1	-1	-1	-1	-1	<i>Definition: Greywater used for toilet flushing</i>
JS:893/2002- Discharge to streams	-1	60	60	150	70	-1	10 ³	-1	1,500	45	-1	-1	1	<i>Definition: Discharge of wastewater to streams, wadis and water storage area</i> <i>E.coli counts (FC) are given in MPN/100 mL</i>

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	eggs/L	
JS:893/2002- Groundwater recharge	2	50	15	50	45	-1	2.2	-1	1,500	30	-1	-1	1	<i>Definition: Wastewater used for groundwater recharge</i> <i>E.coli counts (FC) are given in MPN/100 mL</i>
JS:893/2002- Agricultural irrigation <i>Group A</i>	10	50	30	100	45	-1	100	-1	-1	30	-1	-1	1	<i>Definition: Irrigation with wastewater for cooked vegetables, parking areas, playgrounds and side of roads inside cities</i> <i>E.coli counts (FC) are given in MPN/100 mL</i>
JS:893/2002- Agricultural irrigation <i>Group B</i>	-1	150	200	500	70	-1	10 ³	-1	-1	45	-1	-1	1	<i>Definition: Irrigation with wastewater for plenteous trees and green areas, side of roads outside cities</i> <i>E.coli counts (FC) are given in MPN/100 mL</i>
JS:893/2002- Agricultural irrigation <i>Group C</i>	-1	150	300	500	70	-1	-1	-1	-1	45	-1	-1	1	<i>Definition: Irrigation with wastewater for field crops, industrial crops and forestry</i>

Water quality criteria AQUAREC project , 2006

Seven quality categories (I to VII) for different types of reuses (4 categories) are proposed and microbial and chemical limits for each category are compiled

Microbial parameters include: Total bacteria, fecal coliforms, *Clostridium perfringens*, *Legionella*, *Enterococci*, *Salmonella*, Enteroviruses, *Coliphages*, *Cryptosporidium* and *Giardia*, Nematode eggs, *T. Saginata*, *T.solium*

Fecal coliforms counts for microbial categories in CFU/100 mL:

I: absent II: <20-<1,000 III: absent-<1,000 IV: absent-10,000 V: absent-<10,000 VI: <200-<10,000 VII: absent-10,000

Nematode egg counts for microbial categories in eggs/L:

I: <1-10 II: <1 III: <1 IV: <1 V: <1 VI: <1 VII: <1

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	eggs/L	

Enterovirus counts for microbial categories in pfu/L:

I: absent-10 II: absent-10 III: <1-100 IV: not defined V: not defined VI: <100 VII: <1-0.04

AQUAREC: Private, urban irrigation <i>Category 1</i>	-1	10	10-20	100	-1	2-5	abs.-10,000	-1	1,650-2,400 (3,000 microS/cm)	-1	100	abs.-<100	<1-10	<u>Specific final uses</u> (according to microbial categories): I: Residential uses II: Bathing water III: Urban uses (irrigation of landscape areas, street cleaning, fire-fighting) and unrestricted irrigation IV: Irrigation of industrial crops and animal fodder, restricted irrigation V: Irrigation of forested areas and restricted access areas Additional Total Kjeldahl N: 15-20 mg/L
AQUAREC: Environmental and aquaculture <i>Category 2</i>	-1	10	10-20	70-100	-1	0.2	abs.-10,000	-1	1,650-2,400 (3,000 microS/cm)	-1	70-100	<100	<1	<u>Specific final uses</u> (according to microbial categories): IV: Impoundments, water bodies and streams for recreational use with access (except bathing) V: Impoundments, water bodies and streams for recreational use with access (except bathing) VI: Surface water quality, water bodies and streams for recreational use with restricted access Total Kjeldahl N: 10-20 mg/L
AQUAREC: Indirect aquifer recharge <i>Category 3</i>	-1	-1	-1	70-100	-1	-1	abs.-<10,000	-1	385-560 (700)	25	70-100	-1	<1	<u>Specific final uses</u> (according to microbial categories): V: Aquifer recharge by localized percolation through the soil

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 ml	CFU/100 ml	mg/L	mg N/L	mg/L	PFU/100 ml	eggs/L	
									microS/cm ⁰					
AQUAREC: Industrial cooling Category 4	-1	10	-1	70	-1	0.2	abs.-10,000	-1	-1	-1	70	<1 – 0.04	<1	<i>Specific final uses (according to microbial categories):</i> <i>VII: Industrial cooling except for the food industry</i> <i>Total Kjeldahl N: 10 mg/L</i>

Notes: "Turb" stands for "Turbidity", "TSS" stands for "Total suspended solids", "BOD" stands for "Biological oxygen demand", "COD" stands for "Chemical oxygen demand", "TN" stands for "Total nitrogen", "TP" stands for "Total phosphorous", "FC" stands for "Fecal coliform", "TC" stands for "Total coliform", "TDS" stands for "Total dissolved solids", "TOC" stands for "Total organic carbon".

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	eggs/L	

BS ISO 16075-2:2015

Guidelines for treated wastewater use for irrigation projects (ISO 16075-2, 2015)

Cat. A: Urban and agricultural irrigation of food crops consumed raw	5	10	10	-1	-1	-1	-1	100	-1	-1	-1	-1	-1	Very high quality treated wastewater: Unrestricted urban irrigation and agricultural irrigation of food crops consumed raw
Cat. B: Urban and agricultural irrigation of processed food crops	-1	25	20	-1	-1	-1	-1	1'000	-1	-1	-1	-1	-1	High quality treated wastewater: Restricted urban irrigation and agricultural irrigation of processed food crops
Cat. C: Agricultural irrigation of non-food crops	-1	50	35	-1	-1	-1	-1	10'000	-1	-1	-1	-1	-1	Good quality treated wastewater: Agricultural irrigation of non-food crops
Cat. D: Irrigation of industrial and seeded crops	-1	140	100	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	Medium quality treated wastewater: Restricted irrigation of industrial and seeded crops
Cat. E: Irrigation of industrial and seeded crops	-1	-1	35	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	Extensively quality treated wastewater: Restricted irrigation of industrial and seeded crops

Proposal for a regulation on minimum requirements for water reuse

The European Commission proposed on May 2018 new rules to stimulate and facilitate water reuse in the EU for agricultural irrigation. (Alcalde-Sanz & Gawilk, 2017)

Class A: All food crops	5	10	10	-1	-1	-1	10	-1	-1	-1	-1	-1	-1	All food crops, including root crops consumed raw and food crops where the edible portion is in direct contact with reclaimed water
Class B: Food crops that is not in direct contact with reclaimed water, processed food crops, non-food crops	-1	25	20	-1	-1	-1	100	-1	-1	-1	-1	-1	-1	Food crops consumed raw where the edible portion is produced above ground and is not in direct contact with reclaimed water / Processed food crops / Non-food crops including crops to feed milk- or meat-producing animals
Class C: Food crops that is not in direct contact	-1	35	25	-1	-1	-1	1'000	-1	-1	-1	-1	-1	-1	Food crops consumed raw where the edible portion is produced above ground and is not in direct contact with reclaimed water / Processed food crops / Non-food crops including crops to feed milk- or meat-producing animals

End-use:	Turb NTU	TSS mg/L	BOD mg/L	COD mg/L	TN mg/L	TP mg/L	FC CFU/ 100ml	TC CFU/ 100ml	TDS mg/L	Nitrate mg N/L	TOC mg/L	Virus PFU/ 100ml	Helminths eggs/L	<i>Comments</i>
with reclaimed water, processed food crops, non-food crops Class D: Industrial, energy, and seeded crops	-1	35	25	-1	-1	-1	10'000	-1	-1	-1	-1	-1	-1	<i>Industrial, energy, and seeded crops</i>

Notes: "Turb" stands for "Turbidity", "TSS" stands for "Total suspended solids", "BOD" stands for "Biological oxygen demand", "COD" stands for "Chemical oxygen demand", "TN" stands for "Total nitrogen", "TP" stands for "Total phosphorous", "FC" stands for "Fecal coliform", "TC" stands for "Total coliform", "TDS" stands for "Total dissolved solids", "TOC" stands for "Total organic carbon".

Section 3: Water Quality Standards and Typical Wastewater Quality Considered for Vietnam

Table 3: Poseidon – Wastewater Quality Parameters for Vietnam

Parameters	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Ni- trate	TOC	Note / Reference
Units	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100 ml	CFU/ 100 ml	mg/L	mg N/L	mg/L	
Vietnam Water Quality Standards												
Class A - discharge with drinking water function	-	100	50	150	40	6	-	-	-	10	5,000	Discharge to water bodies with a function of drinking water supply (Class A) .QCVN 40:2011 Discharge to water bodies without function of drinking water supply (Class B) QCVN 40:2011 QCVN 39: 2011/BTNMT
Class B - discharge without drinking water function	-	100	50	150	40	6	-	-	-	10	5,000	
Irrigation	-	-	-	-	-	-	200	-	2,000	-	-	
International Organization for Standardization (ISO) – BS ISO 16075-2:2015												Guidelines for treated wastewater use for irrigation projects (ISO 16075-2 2015)
Cat A Unrestricted urban irrigation and agricultural irrigation of food crops consumed raw	5	10	10	-	-	-	-	100	-	-	-	Cat. A: Very high quality treated wastewater
Cat. B: Restricted urban irrigation and agricultural irrigation of processed food crops	-	25	20	-	-	-	-	1,000	-	-	-	Cat. B: High quality treated wastewater
Cat. C: Agricultural irrigation of non-food crops	-	50	35	-	-	-	-	10,000	-	-	-	Cat. C: Good quality treated wastewater
Cat. D: Restricted irrigation of industrial and seeded crops	-	140	100	-	-	-	-	-	-	-	-	Cat. D: Medium quality treated wastewater
Cat. E: Restricted irrigation of industrial and seeded crops	-	-	35	-	-	-	-	-	-	-	-	Cat. E: Extensively quality treated wastewater
Texas water reuse standards												(Example indicated in US EPA guidelines, 2012)
Texas EPA: Industrial Reuse- Recirculating Cooling Towers	-	-	20.00	-	-	-	200.00	-	-	-	-	BOD: 20 mg/L without pond; 30 mg/L with pond Add. Parameter: Enterococci: 35 CFU/100 mL (max. 89 CFU/100 mL)
Typical Municipal Wastewater Vietnam												
Typical untreated MWW Vietnam	100	86	94	189	44	-	10,000	1E+07	720	18	140	Estimated, based on (World Bank 2013) and own estimations.
Typical treated wastewater Vietnam	2	6	11	22	16	-	-	10,000	500	3	10	Estimated, based on (World Bank 2013) and own estimations.
Typical Industrial Park Wastewater Vietnam												

Parameters	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Ni- trate	TOC	Note / Reference
Units	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100 ml	CFU/ 100 ml	mg/L	mg N/L	mg/L	
Typical IP Effluent – before treatment	-	200	200	400	60	8	-	3,000	-	-	-	Thuan Dao Industrial Zone, The People’s Committee of Long An Province. 2011. The Preparatory Survey on Utility Management of Environment-Friendly Industrial Parks in Vietnam. Thuan Dao Industrial Zone, The People’s Committee of Long An Province. 2011. The Preparatory Survey on Utility Management of Environment-Friendly Industrial Parks in Vietnam.
Typical IP Effluent – after treatment	-	49.5	29.7	49.5	14.85	3.96	-	3,000	-	-	-	
Hanoi Municipal Wastewater												
Hanoi, Influent (Best quality)	-	51	45	115	34	-	-	-	-	18	-	(World Bank 2013)
Hanoi, Influent (Worst quality)	-	91	94	189	44	-	-	-	-	28	-	(World Bank 2013)
Hanoi, Effluent (Best quality)	-	5	9	17	8	-	-	-	-	0.5	-	(World Bank 2013)
Hanoi, Effluent (Worst quality)	-	10	12	24	16	-	-	-	-	0.5	-	(World Bank 2013)
Ho Chi Minh City Municipal Wastewater												
Ho Chi Minh City, Influent (Best quality)	-	49	42	135	11	-	-	-	-	18	-	(World Bank 2013)
Ho Chi Minh City, Influent (Worst quality)	-	103	78	203	11	-	-	-	-	18	-	(World Bank 2013)
Ho Chi Minh City, Effluent(Best quality)	-	7	3	30	7	-	-	-	-	3.3	-	(World Bank 2013)
Ho Chi Minh City, Effluent(Worst quality)	-	18	10	50	7	-	-	-	-	3.3	-	(World Bank 2013)
Da Nang Municipal Wastewater												
Da Nang, Influent (Best quality)	-	28	34	64	16	-	-	-	-	-	-	(World Bank 2013)
Da Nang, Influent (Worst quality)	-	73	101	178	28	-	-	-	-	-	-	(World Bank 2013)
Da Nang, Effluent (Best quality)	-	16	26	47	13	-	-	-	-	-	-	(World Bank 2013)
Da Nang, Effluent (Worst quality)	-	23	38	76	21	-	-	-	-	-	-	(World Bank 2013)
Quang Ninh Municipal Wastewater												
Quang Ninh, Influent (Best quality)	-	41	36	68	0.1	-	-	-	-	1.1	-	(World Bank 2013)
Quang Ninh, Influent (Worst quality)	-	195	45	80	0.1	-	-	-	-	1.3	-	(World Bank 2013)
Quang Ninh, Effluent (Best quality)	-	11	20	32	0.2	-	-	-	-	1	-	(World Bank 2013)
Quang Ninh, Effluent (Worst quality)	-	35	23	68	0.2	-	-	-	-	1	-	(World Bank 2013)

Parameters	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Ni- trate	TOC	Note / Reference
Units	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100 ml	CFU/ 100 ml	mg/L	mg N/L	mg/L	

Notes: "Turb" stands for "Turbidity", "TSS" stands for "Total suspended solids", "BOD" stands for "Biological oxygen demand", "COD" stands for "Chemical oxygen demand", "TN" stands for "Total nitrogen", "TP" stands for "Total phosphorous", "FC" stands for "Fecal coliform", "TC" stands for "Total coliform", "TDS" stands for "Total dissolved solids", "TOC" stands for "Total organic carbon".

Section 4: Water Quality Standards Considered for Egypt, Morocco and Tunisia

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	eggs/L	
Moroccan water irrigation regulation														
Cat A: irrigation of crops to be eaten raw	-1	100-200	-1	-1	-1	-1	1'000	-1	-1	30	-1	-1	0	(S.E.E.E., 2007) Quality standards of water for irrigation, crops to be eaten raw (category A)
Cat B & C: irrigation of other crops	-1	100-200	-1	-1	-1	-1	-1	-1	-1	30	-1	-1	0	(S.E.E.E., 2007) Quality standards of water for irrigation, other crops (categories B&C)
Moroccan water quality grid for surface water														
Excellent	-1	-1	3	30	-1	0.1	20	-1	-1	-1	-1	-1	-1	National reports of the MED POL programme: 2005, 2010 and 2012., (European Environment Agency, 2014)
Good	-1	-1	3-5	30-35	-1	0.1-0.3	20-2'000	-1	-1	-1	-1	-1	-1	National reports of the MED POL programme: 2005, 2010 and 2012., (European Environment Agency, 2014)
Average	-1	-1	5 – 10	35-40	-1	0.3-0.5	2'000-20'000	-1	-1	-1	-1	-1	-1	National reports of the MED POL programme: 2005, 2010 and 2012., (European Environment Agency, 2014)
Poor	-1	-1	10 – 25	40-80	-1	0.5-3	20'000	-1	-1	-1	-1	-1	-1	National reports of the MED POL programme: 2005, 2010 and 2012., (European Environment Agency, 2014)

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	eggs/L	
Very poor	-1	-1	25	80	-1	3	-1	-1	-1	-1	-1	-1	-1	National reports of the MED POL programme: 2005, 2010 and 2012., (European Environment Agency, 2014)

Moroccan Water quality grid for ground water

Excellent	-1	-1	-1	-1	-1	-1	20	-1	-1	5	-1	-1	-1	National reports of the MED POL programme: 2005, 2010 and 2012., (European Environment Agency, 2014)
Good	-1	-1	-1	-1	-1	-1	20- 2'000	-1	-1	5-25	-1	-1	-1	National reports of the MED POL programme: 2005, 2010 and 2012., (European Environment Agency, 2014)
Average	-1	-1	-1	-1	-1	-1	2'000- 20'000	-1	-1	25-50	-1	-1	-1	National reports of the MED POL programme: 2005, 2010 and 2012., (European Environment Agency, 2014)
Poor	-1	-1	-1	-1	-1	-1	20'000	-1	-1	50	-1	-1	-1	National reports of the MED POL programme: 2005, 2010 and 2012., (European Environment Agency, 2014)
Very poor	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	National reports of the MED POL programme: 2005, 2010 and 2012., (European Environment Agency, 2014)

Tunisia

Tunisian guidelines for wastewater reuse

NT 106.03 standard: irrigation	-1	30	30	90	-1	-1	-1	-1	-1	1	-1	-1	1	(WHO, 2006) Tunisian Standard of wastewater reuse for irrigation (1989), NT 106-03 standard. There are many other measurements that are not included in this table
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End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	eggs/L	
Norm 106.03 revised, Cat I: Agriculture use	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	(Food and Agricultural Organisation of the United Nations, 2013) <i>Use of treated wastewater for agricultural purposes.</i>
Norm 106.03 revised, Cat II: Golf places, urban parcs, green zones	-1	-1	-1	-1	-1	-1	1000	-1	-1	-1	-1	-1	0.1	(Food and Agricultural Organisation of the United Nations, 2013) <i>Irrigation of golf courses, urban parks and green spaces in urban areas.</i>
Norm 106.03 revised, Cat III: infiltration of groundwater for agricultural use	5	-1	20	125	15	-1	1000	-1	-1	-1	-1	-1	1	(Food and Agricultural Organisation of the United Nations, 2013) <i>Recharge by infiltration of groundwater intended solely for agricultural use</i>

Tunisian Guidelines for wastewater discharge

Discharge into the Maritime Public Domain (DPM)	-1	-1	30-50	125-160	-1	2 (total phosphor)	2'000	-1	-1	90	-1	-1	1 (Œufs de Némato des intestinaux)	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available. Rejet dans le Domaine public maritime (DPM)</i>
Discharge into the Public Domain of Hydraulics (DPH)	-1	-1	30-50	125-160	-1	2 (total phosphor)	2'000	-1	-1	50	-1	-1	1 (Œufs de Némato des intestinaux)	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available. Rejet dans le Domaine public hydraulique (DPH)</i>
Discharge into the Public Sewerage System Domain (RPA)	-1	-1	400	1'000	-1	10 (total phosphor)	-1	-1	-1	90	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available. Rejet dans le Domaine réseau public d'assainissement (RPA)</i>

Tunisian Guidelines for wastewater discharge divided by type of activity

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	eggs/L	
Fruit and vegetable industry (DPM)	-1	-1	50	125	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Fruit and vegetable industry (DPH)	-1	-1	50	125	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Fruit and vegetable industry (RPA)	-1	-1	400	1'000	-1	10	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Milk and milk products industry (DPM)	-1	-1	50	200	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Milk and milk products industry (DPH)	-1	-1	50	200	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Milk and milk products industry (RPA)	-1	-1	400	1'000	-1	10	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Meat and slaughterhouse industry (DPM)	-1	-1	50	200	-1	2	-1	-1	-1	90	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Meat and slaughterhouse industry (DPH)	-1	-1	50	200	-1	2	-1	-1	-1	50	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	eggs/L	
Meat and slaughterhouse industry (RPA)	-1	-1	400	1'000	-1	10	-1	-1	-1	90	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Oil and fat industry (DPM)	-1	-1	50	125	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Oil and fat industry (DPH)	-1	-1	50	125	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Oil and fat industry (RPA)	-1	-1	400	1'000	-1	10	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Fish and seafood industry (DPM)	-1	-1	50	125	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Fish and seafood industry (DPH)	-1	-1	50	200	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Fish and seafood industry (RPA)	-1	-1	400	1'000	-1	10	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Beverage industry (DPM)	-1	-1	30	125	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	eggs/L	
Beverage industry (DPH)	-1	-1	30	125	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Beverage industry (RPA)	-1	-1	400	1'000	-1	10	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Yeast industry (DPM)	-1	-1	50	200	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Yeast industry (DPH)	-1	-1	50	200	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Yeast industry (RPA)	-1	-1	400	1'000	-1	10	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Sugar industry (DPM)	-1	-1	50	200	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Sugar industry (DPH)	-1	-1	50	200	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Sugar industry (RPA)	-1	-1	400	1'000	-1	10	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	eggs/L	
Mechanical and metallurgical industries (steel, foundry, non-ferrous metals) (DPM)	-1	-1	-1	150	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Mechanical and metallurgical industries (steel, foundry, non-ferrous metals) (DPH)	-1	-1	-1	150	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Mechanical and metallurgical industries (steel, foundry, non-ferrous metals) (RPA)	-1	-1	-1	1'000	-1	10	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Electrical, Electronics and household appliance industries (DPM)	-1	-1	50	200	-1	-1	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Electrical, Electronics and household appliance industries (DPH)	-1	-1	50	200	-1	-1	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Electrical, Electronics and household appliance industries (RPA)	-1	-1	400	1'000	-1	-1	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Battery industry (DPM)	-1	-1	-1	200	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Battery industry (DPH)	-1	-1	-1	200	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The</i>

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	eggs/L	
Battery industry (RPA)	-1	-1	-1	1'000	-1	10	-1	-1	-1	-1	-1	-1	-1	<i>listed values are a selection of all measurements available.</i> (Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Chemical and pharmaceutical industries (DPM)	-1	-1	30	150	-1	2	-1	-1	-1	-1	-1	-1	-1	<i>listed values are a selection of all measurements available.</i> (Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Chemical and pharmaceutical industries (DPH)	-1	-1	50	200	-1	2	-1	-1	-1	-1	-1	-1	-1	<i>listed values are a selection of all measurements available.</i> (Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Chemical and pharmaceutical industries (RPA)	-1	-1	400	1'000	-1	10	-1	-1	-1	-1	-1	-1	-1	<i>listed values are a selection of all measurements available.</i> (Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Textile and clothing industries (DPM)	-1	-1	30	160	-1	2	-1	-1	-1	-1	-1	-1	-1	<i>listed values are a selection of all measurements available.</i> (Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Textile and clothing industries (DPH)	-1	-1	30	160	-1	2	-1	-1	-1	-1	-1	-1	-1	<i>listed values are a selection of all measurements available.</i> (Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Textile and clothing industries (RPA)	-1	-1	400	1'000	-1	10	-1	-1	-1	-1	-1	-1	-1	<i>listed values are a selection of all measurements available.</i> (Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>

End-use:	Turb NTU	TSS mg/L	BOD mg/L	COD mg/L	TN mg/L	TP mg/L	FC CFU/ 100ml	TC CFU/ 100ml	TDS mg/L	Nitrate mg N/L	TOC mg/L	Virus PFU/ 100ml	Helminths eggs/L	Comments
Leather and footwear industries (tanneries and shantytowns) (DPM)	-1	-1	-1	-1	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Leather and footwear industries (tanneries and shantytowns) (DPH)	-1	-1	-1	-1	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Leather and footwear industries (tanneries and shantytowns) (RPA)	-1	-1	-1	-1	-1	10	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Pulp, paper and cardboard industries (DPM)	-1	-1	40-80	125-700	-1	-1	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Pulp, paper and cardboard industries (DPH)	-1	-1	40-80	125-700	-1	-1	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Pulp, paper and cardboard industries (RPA)	-1	-1	400	1'000	-1	-1	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Building materials, ceramics and glass industries (DPM)	-1	-1	50	125	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Building materials, ceramics and glass industries (DPH)	-1	-1	50	125	-1	2	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	eggs/L	
Building materials, ceramics and glass industries (RPA)	-1	-1	400	1'000	-1	10	-1	-1	-1	-1	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>
Seawater and brackish water desalination units (DPM)	-1	-1	-1	-1	-1	2	-1	-1	-1	90	-1	-1	-1	(Ministere du Commerce et Ministere des Affaires Locales et de l'environnement, 2018) <i>The listed values are a selection of all measurements available.</i>

Egypt

Egyptian Guidelines for wastewater reuse

Level A: landscape irrigation in urban areas	-1	20	20	-1	-1	-1	-1	1'000	-1	-1	-1	-1	-1	(Elbana, Bakr, Karajeh, El, & El, 2014) <i>Criteria of treated wastewater for agricultural use / Treatment Level A (landscape irrigation in urban areas)</i>
Level B: agriculture purposes in desert areas	-1	50	60	-1	-1	-1	-1	5'000	-1	-1	-1	-1	-1	(Elbana et al., 2014) <i>Criteria of treated wastewater for agricultural use / Treatment Level B (agriculture purposes in desert areas)</i>
Level C: agriculture purposes in desert areas	-1	250	400	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	(Elbana et al., 2014) <i>Criteria of treated wastewater for agricultural use / Treatment Level C (agriculture purposes in desert areas)</i>
Egyptian drinking water quality standards (EWQS)	-1	-1	-1	-1	-1	-1	-1	-1	-1	10'000	-1	-1	-1	(Abdel-Satar, Ali, & Goher, 2017)
Law 48/1982: Protection of the River Nile and water ways	-1	-1	6-10	10-15	-1	-1	-1	-1	500	-1	-1	-1	-1	(El Bouraie, Motawea, Mohamed, & Yehia, 2011) <i>Egyptian Law for protection of the River Nile and water ways from pollution</i>

BS ISO 16075-2:2015

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	eggs/L	

Guidelines for treated wastewater use for irrigation projects (ISO 16075-2, 2015)

Cat. A: Urban and agricultural irrigation of food crops consumed raw	5	10	10	-1	-1	-1	-1	100	-1	-1	-1	-1	-1	<i>Very high quality treated wastewater: Unrestricted urban irrigation and agricultural irrigation of food crops consumed raw</i>
Cat. B: Urban and agricultural irrigation of processed food crops	-1	25	20	-1	-1	-1	-1	1'000	-1	-1	-1	-1	-1	<i>High quality treated wastewater: Restricted urban irrigation and agricultural irrigation of processed food crops</i>
Cat. C: Agricultural irrigation of non-food crops	-1	50	35	-1	-1	-1	-1	10'000	-1	-1	-1	-1	-1	<i>Good quality treated wastewater: Agricultural irrigation of non-food crops</i>
Cat. D: Irrigation of industrial and seeded crops	-1	140	100	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	<i>Medium quality treated wastewater: Restricted irrigation of industrial and seeded crops</i>
Cat. E: Irrigation of industrial and seeded crops	-1	-1	35	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	<i>Extensively quality treated wastewater: Restricted irrigation of industrial and seeded crops</i>

Proposal for a regulation on minimum requirements for water reuse

The European Commission proposed on May 2018 new rules to stimulate and facilitate water reuse in the EU for agricultural irrigation. (Alcalde-Sanz & Gawilk, 2017)

Class A: All food crops	5	10	10	-1	-1	-1	10	-1	-1	-1	-1	-1	-1	<i>All food crops, including root crops consumed raw and food crops where the edible portion is in direct contact with reclaimed water</i>
Class B: Food crops that is not in direct contact with reclaimed water, processed food crops, non-food crops	-1	25	20	-1	-1	-1	100	-1	-1	-1	-1	-1	-1	<i>Food crops consumed raw where the edible portion is produced above ground and is not in direct contact with reclaimed water / Processed food crops / Non-food crops including crops to feed milk- or meat-producing animals</i>
Class C: Food crops that is not in direct contact with reclaimed water, processed food crops, non-food crops	-1	35	25	-1	-1	-1	1'000	-1	-1	-1	-1	-1	-1	<i>Food crops consumed raw where the edible portion is produced above ground and is not in direct contact with reclaimed water / Processed food crops / Non-food crops including crops to feed milk- or meat-producing animals</i>

End-use:	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Helminths	<i>Comments</i>
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	eggs/L	
Class D: Industrial, energy, and seeded crops	-1	35	25	-1	-1	-1	10'000	-1	-1	-1	-1	-1	-1	<i>Industrial, energy, and seeded crops</i>

Notes: "Turb" stands for "Turbidity", "TSS" stands for "Total suspended solids", "BOD" stands for "Biological oxygen demand", "COD" stands for "Chemical oxygen demand", "TN" stands for "Total nitrogen", "TP" stands for "Total phosphorous", "FC" stands for "Fecal coliform", "TC" stands for "Total coliform", "TDS" stands for "Total dissolved solids", "TOC" stands for "Total organic carbon".

Section 5: Typical Wastewater Qualities Considered for Egypt, Morocco and Tunisia

Wastewater qualities of potential input	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Reference/ Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	
Morocco													
Small centres (< 20'000 inhabitants)	-1	500	400	1'000	-1	-1	-1	-1	-1	-1	-1	-1	(Salama et al., 2014)
Average centres (20'000-100'000 inhabitants)	-1	400	350	950	-1	-1	-1	-1	-1	-1	-1	-1	(Salama et al., 2014)
Large cities (>100'000 inhabitants)	-1	300	300	850	-1	-1	-1	-1	-1	-1	-1	-1	(Salama et al., 2014)
National Average	-1	400	350	800	-1	-1	-1	-1	-1	-1	-1	-1	(Salama et al., 2014)
Small community raw ww	-1	328	-1	746	115	-1	-1	5,600,000 (E. coli)	-1	-1	-1	-1	(Bouchaib, Hamouri, Kinsley, & Crolla, 2012) <i>Average values</i>
Small community secondary hf wetland ww	-1	25	-1	56	40	-1	-1	210,000 (E. coli)	-1	-1	-1	-1	(Bouchaib et al., 2012) <i>Average values</i>
Egypt													
Community-managed Wastewater Treatment System,	-1	152	450	782	-1	-1	-1	1'500'000'000	-1	-1	-1	-1	(HafenCity Universität Hamburg, 2016)

Wastewater qualities of potential input	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Reference/ Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	
Kafr el Sheikh, Egypt - Inlet Community-managed Wastewater Treatment System, Kafr el Sheikh, Egypt - Outlet	-1	21	28	40	-1	-1	-1	260	-1	-1	-1	-1	(HafenCity Universität Hamburg, 2016)

Tunisia

Gabès City WWTP, Effluent (2004)	-1	-1	2.5-5.9	17.1-44.9	-1	-1	2.00E2-6.50E2	-1	-1	4.1-37	-1	-1	(Dare et al., 2017)
Gabès City WWTP, Effluent (2013)	-1	-1	31.0-60.0	46.5-139.4	-1	-1	-1	4250-4420 (EC)	-1	0-14.6	-1	-1	(Dare et al., 2017)
El Hamma WWTP, Effluent	-1	-1	20.0-20.8	223.9	-1	-1	1.19E6 - 2.10E6	5120-5140 (EC)	-1	23.5-39.0	-1	-1	(Dare et al., 2017)
Urban Waste Water	40-494	21-1700	90-480	215-1134	-1	-1	340'000 - 1'100'000	1'000'000 - 5'300'000	-1	0.4-2.2	80.4-428.6	-1	(Jraou, Feki, Arnot, Skouteris, & Sayadi, 2013)

Industrial Wastewater

Textile industry:

Wastewater qualities of potential input	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Reference/ Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	
Textile Industry-Tunisia, Nabeul (average composition)	334	104-357	69-125	356-692	-1	-1	-1	-1	-1	-1	-1	-1	(Fracari, 2019b) <i>Specific contaminates such as dyes and bleaches are not considered.</i>
Wastewater discharged from five factories (mixed sample), Egypt	-1	79.8	229	507	-1	-1	-1	-1	-1	0.46	-1	-1	(El-Gohary, Ibrahim, Nasr, Abo-Shosha, & Ali, 2013) <i>The listed values are a selection of all measurements available. Due to the limitation of possible inputs in Triton.</i>

Olive mill

Wastewater quality values	-1	12'000	40'000	60'000	80	300	Low	Low	-1	-1	-1	-1	(Oertlé & Gauer, 2018) <i>Specific contaminates such as polyphenols are not considered. (Average 3000 mg/l polyphenols)</i>
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Fruit and Vegetable package

Wastewater Quality Values, MAC	-1	250	350	700	30	15	8'000'000	30'000'000	-1	-1	-1	-1	(Oertlé & Gauer, 2018) / <i>Specific contaminates such as fungicides, pesticides or waxes are not considered.</i>
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Irrigation

Drainage Canal Water

Bahr El Baqar drain, Tunisia	-1	95-110	62-74	120-165	-1	3-4.5	178'000 - 235'000	410'000 - 480'000	-1	-1	-1	-1	(Fracari, 2019a)
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Wastewater qualities of potential input	Turb	TSS	BOD	COD	TN	TP	FC	TC	TDS	Nitrate	TOC	Virus	Reference/ Comments
	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/ 100ml	CFU/ 100ml	mg/L	mg N/L	mg/L	PFU/ 100ml	
Average DCW composition	-1	80-160	40-84	72-120	12-30	3-5	178'000 - 235'000	-1	-1	-1	-1	-1	(Frasconi, 2019a)
Drain, Khour Sail Aswan, Egypt	-1	184	204	375	-1	2.3	35'000	65'000	995	220.0	-1	-1	(Brown, Gohary, Tawfic, Imam, & Abdel-Gawad, 2003)

Notes: "Turb" stands for "Turbidity", "TSS" stands for "Total suspended solids", "BOD" stands for "Biological oxygen demand", "COD" stands for "Chemical oxygen demand", "TN" stands for "Total nitrogen", "TP" stands for "Total phosphorous", "FC" stands for "Fecal coliform", "TC" stands for "Total coliform", "TDS" stands for "Total dissolved solids", "TOC" stands for "Total organic carbon".

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