Drinking Water Aesthetic Values

The aesthetic properties of a water concern its taste, odour, appearance and in some instances its feel (at higher pH values). Consumers will generally be more aware of these properties of their drinking water than the presence of health-significant determinands that influence the water's safety. A water is considered *acceptable* when its aesthetic properties are not objectionable to the majority of its consumers and when the values of specific determinands lie within the acceptable range set out in the table below.

Most aesthetic properties do not *directly* influence the safety of the water. However, in extreme cases, water that consumers consider aesthetically unacceptable can cause them to seek water from other, possibly unsafe sources. To guard against this possibility, water suppliers have a legal duty (*Section 24, Water Services Act 2021*) to take all reasonably practicable steps to ensure that they provide their consumers with aesthetically acceptable water.

The table below lists some determinands that can adversely affect the aesthetic properties of drinking water and the approximate range within which the determinand should be aesthetically acceptable. The acceptable ranges are those that scientific studies and experience indicate should ensure a water that is acceptable to most consumers. Where the World Health Organization (WHO) has set acceptability values for a determinand, this value has been adopted. Sensitivity to determinands varies between individuals; some are more sensitive to some determinands than the majority of the population. Therefore, it is not possible to say that meeting these values will ensure acceptability of the water for everybody.

The table's most important component is the general requirement that taste, and odour, should be acceptable to most consumers. This is not necessarily achieved by all numerical values in the table being met, because of the wide range of determinands that can adversely affect the aesthetic properties of a water.

In addition to testing to determine that the values in Table 1 have been met, water suppliers must be aware of their consumers' perception of the acceptability of their water supply. Complaints about water quality can provide valuable information about the quality of the reticulated water, and in some instances may alert the water supplier to the presence of determinands of health significance.

Table 1: Acceptable ranges for determinands that may affect the aesthetic properties of a drinking water.

Determinand	Acceptable Range	Unit	Comments
Aluminium	≤ 0.1	mg/L	Above this value, complaints of depositions or discoloration may arise.
Ammonia	≤ 1.5	mg/L	Odour threshold (alkaline conditions).
Calcium			See 'Hardness'.
Chloride	≤ 250	mg/L	Taste threshold (depends on the counter ion: sodium, calcium or potassium).
Chlorine	0.3 – 0.6	mg/L as Cl_2	Taste and odour threshold (pH-dependant). (Disinfection must not be compromised in trying to avoid taste and odour complaints).
2-Chlorophenol	≤ 0.0001	mg/L	Taste threshold.
	≤ 0.01		Odour threshold.
Colour	≤ 15	TCU	Appearance.
Copper	≤ 1	mg/L	Staining of laundry and sanitary ware.
1,2-Dichlorobenzene	≤ 0.001	mg/L	Taste threshold.
	≤ 0.002		Odour threshold.
1,4-Dichlorobenzene	≤ 0.0003	mg/L	Odour threshold.
	≤ 0.006		Taste threshold.
2,4-Dichlorophenol	≤ 0.0003	mg/L	Taste threshold.
	≤ 0.04		Odour threshold.
Ethylbenzene	≤ 0.002	mg/L	Odour threshold.
	≤ 0.08		Taste threshold.
Hardness (total) (Ca + Mg) as $CaCO_3$	≤ 200	mg/L	Scale deposition, scum formation, depending on pH and alkalinity. Low hardness (<100) may be more corrosive.
	≤ 100–300		Taste threshold (Ca; depends on counter ion).
Hydrogen sulphide	≤ 0.05	mg/L	Taste and odour threshold.
Iron	≤ 0.3	mg/L	Staining of laundry and sanitary ware.
Magnesium			See hardness.
Manganese	≤ 0.04	mg/L	Staining of laundry.
	≤ 0.10		Taste threshold.
Monochlorobenzene	≤ 0.01	mg/L	Taste and odour threshold.

Determinand	Acceptable Range	Unit	Comments
pH	7.0–8.5		Ideally 7.4 – 8.0. Most waters with a low pH have a high plumbosolvency. Waters with a high pH have a soapy taste and feel. A pH less than 8 is preferable for effective disinfection with chlorine.
Sodium	≤ 200	mg/L	Taste threshold (depends on counter ion).
Styrene	≤ 0.004	mg/L	Odour threshold.
Sulphate	≤ 250	mg/L	Taste threshold.
Taste and odour	Acceptable to most consumers		
Temperature	Preferably not more than 15°C		
Toluene	≤ 0.03	mg/L	Odour threshold.
	≤0.04		Taste threshold.
Total dissolved solids	≤ 1000	mg/L	Taste may become unacceptable from 600–1200 mg/L.
Trichlorobenzenes (total)	see below		
1,2,3-Trichlorobenzene	≤ 0.01	mg/L	Odour threshold.
1,2,4-Trichlorobenzene	≤ 0.005	mg/L	Odour threshold.
1,3,5-Trichlorobenzene	≤ 0.05	mg/L	Odour threshold.
2,4,6-Trichlorophenol	≤ 0.002	mg/L	Taste threshold.
	0.3	mg/L	Odour threshold.
Turbidity	≤ 4	NTU	Appearance. See compliance criteria for effects on disinfection.
Xylene	≤ 0.02	mg/L	Odour threshold.
Zinc	≤ 1.5	mg/L	Taste threshold.