

South African Department of Water Affairs (DWAF)

In South Africa, water is a public asset and managed by the Department of Water and Forestry (DWAF) in terms of the Water Act No 36 of 1998. DWAF is the single largest bulk supplier of water in South Africa. Under its direct control are a number of water schemes, which supply around 60% of water to the agricultural sector.

Under the present Government, the control of waste management by the Department of Water and Forestry remains the responsibility of central government, while certain other responsibilities have been devolved to the provinces. General waste collection and disposal are normally the responsibility of the local authority. Policy formulation and compliance monitoring takes place at both the regional and national levels of government.

The Departments of Environmental Affairs and Tourism, Water Affairs and Forestry, Mineral and Energy Affairs, Health, Transport and Agriculture all administer laws relevant to pollution control and waste management. Overlap of duties and division of responsibilities among the different departments is evident.

In South Africa the use of water, whether from a river, dam or underground source, for industrial purposes (which includes domestic use in urban areas) is governed by the Water Act No 36 of 1998 as amended. The Act states that: "... water extracted for industrial purposes shall be returned to the source from which it was abstracted, in accordance with quality standards gazetted by the Minister from time to time."

Water Act No 36 of 1998 as amended

Substance / Parameter	General Limit	Special Limit
Faecal Coliforms (per 100 ml)	1 000	0
Chemical Oxygen Demand (mg/l)	75 After removal of algae	30 After removal of algae
pH	5,5 - 9,5	5,5 - 7,5
Chlorine as Free Chlorine (mg/l)	0,25	0
Suspended Solids (mg/l)	25	10
Electrical Conductivity (mS/m)	70 mS/m above intake to a max of 150 mS/m	50 mS/m above background receiving water, to a max of 100 mS/m
Ortho-Phosphate as phosphorous (mg/l)	10	1 (median) and 2,5 (maximum)
Fluoride	1	1
Soap, oil or grease (mg/l)	2,5	0
Dissolved Arsenic (mg/l)	0,02	0,01
Dissolved Cadmium (mg/l)	0,05	0,001
Dissolved Chromium (VI) (mg/l)	0,05	0,02
Dissolved Copper (mg/l)	0,01	0,002
Dissolved Cyanide (mg/l)	0,02	0,01
Dissolved Iron (mg/l)	0,3	0,3
Dissolved Lead (mg/l)	0,01	0,006
Dissolved Manganese (mg/l)	0,1	0,1
Mercury and its compounds (mg/l)	0,005	0,001
Dissolved Selenium (mg/l)	0,02	0,02
Dissolved Zinc (mg/l)	0,1	0,04
Boron (mg/l)	1	0,5

Definitions

The following meanings of the words and expressions listed below have been assigned in terms of the National Water Act:

1. **biodegradable industrial wastewater** means wastewater that contains predominantly organic waste arising from industrial activities and premises including:
milk processing; manufacture of fruit and vegetable products; sugar mills; manufacture and bottling of soft drinks;
2. **commercial activity** means those activities identified in the Standard Industrial Classification of All Economic Activities (5th Edition), published by the Central Statistics Service, 1993, as amended and supplemented, under the following categories:
wholesale and retail trade; transport, storage and communication; business services; community, social and personal services; personal and other services;
3. **complex industrial waste** means wastewater arising from industrial activities and premises that contains a complex mixture of substances that are difficult or impractical to chemically characterise and quantify, or one or more substances, for which a Wastewater Limit Value has not been specified, and which may be harmful or potentially harmful to human health, or to the water resource;
4. **domestic wastewater** means wastewater arising from domestic and commercial activities and premises and may contain sewage;
5. **domestic wastewater discharge** means a wastewater discharge consisting of 90% or more domestic wastewater, by volume, that is collected, treated and subsequently disposed of;
6. **intake** is water taken from a water resource, and excludes water taken from any source that is not a water resource;
7. **primary treatment** means treatment of wastewater by a physical process, which may involve maceration, sedimentation, screening and grit removal;
8. **secondary treatment** means treatment of wastewater by a biological process, through solar and other energy, bacteria, algae and a variety of aquatic biota, to remove organic matter;
9. **wastewater** means water containing waste, or water that has been in contact with waste material;

wastewater limit value means the mass expressed in terms of the concentration and/or level of a substance which may not be exceeded at any time. Wastewater Limit Values shall apply at the last point where the discharge of wastewater enters into a water resource, dilution being disregarded when determining compliance with the Wastewater Limit Values. Where discharge of wastewater does not directly enter a water resource, the Wastewater Limit Values shall apply at the last point where the wastewater leaves the premises of collection and treatment.

Local Authority Responsibilities

Local authorities generally have responsibility for the collection and treatment of sewage in urban areas, to the standards gazetted, and to discharge the treated effluent back to the original source of extraction. In the case of a factory, which is not located in an urban area, using water for its manufacturing process, and which produces an effluent, the owners are responsible for the treatment of the effluent, in accordance with the Water Act.

The majority of new wastewater treatment plants are of the activated sludge type, with variations depending on specific requirements, such as the need to reduce the nutrient concentration or the re-use potential. Several large coastal cities operate sea outfalls, for which special discharge standards apply.

Sludge disposal

The disposal of sludges is becoming an increasing problem, and mechanical means of dewatering are now common in large Wastewater Treatment Plants (WWTP).

Re-use of sewage effluent

Re-use of sewage effluent is practiced in several major cities.

Mining and Industry

The mining industry is a major player in the water industry. The problems associated with mine water in regard to the environment will require massive expenditure in the future.

As an example of local municipal charges, the formula for calculating drainage tariffs for the Greater East Rand Metro trading as Ekurhuleni Metropolitan Council is included.

"The owner of premises on which any trade or industry is carried out and from which, as a result of such trade or industry or of any process incidental thereto, any effluent is discharged into the sewer, shall in addition to any other charges for which he may be liable in terms of this determination, pay to the Council an amount calculated on the quantity of effluent discharged, the strengths and the relevant allowed concentrations of the effluent discharged during the period of the charge and in accordance with the formulae set out hereunder:"

$$T_i = C \left(\frac{Q_i}{Q_t} \right) \left[0,29 + 0,26 \left(\frac{COD_i}{COD_t} \right) + 0,16 \left(\frac{P_i}{P_t} \right) + 0,15 \left(\frac{N_i}{N_t} \right) + 0,14 \left(\frac{SS_i}{SS_t} \right) \right]$$