



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Engineering Technical Standards for Seepage Control System
of Domestic Waste Sanitary Landfill Site**

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1 General

1.0.1 This standard is formulated in order to ensure the reliability and safety of the anti-seepage system engineering of domestic garbage sanitary landfills (hereinafter referred to as "landfills"), and to prevent the leakage of garbage leachate from polluting the surrounding environment.

1.0.2 This standard is applicable to the design, construction, acceptance and maintenance of anti-seepage system engineering of newly built, expanded and reconstructed landfill sites.

1.0.3 The design, construction, acceptance and maintenance of the anti-seepage system engineering of the landfill shall not only comply with this standard, but also comply with the current relevant national standards.

2.0.1 anti-seepage system liner system

A system composed of various materials selected for the construction of leachate anti-seepage barriers on the bottom of the landfill reservoir area and the regulating tank

and on the surrounding slopes.

2.0.2 anti-seepage system liner structure

The spatial level of anti-seepage system composed of various materials, including base layer, anti-seepage layer and its protective layer, leachate drainage system and groundwater drainage system. According to the type of anti-seepage layer, it can be divided into clay lining structure and synthetic lining structure.

2.0.3 Base layer liner foundation

The foundation of the anti-seepage material is divided into the foundation layer at the bottom of the site and the foundation layer at the surrounding slopes.

2.0.4 anti-seepage layer sealing liner

In the anti-seepage system, the combination of various materials selected for the construction of the leachate anti-seepage barrier.

2.0.5 leachate collection and removal system

On the upper part of the anti-seepage system in the landfill reservoir area, it is a facility for collecting and exporting leachate.

2.0.6 groundwater collection and removal system

In the lower part of the anti-seepage system, it is a facility for collecting and guiding groundwater.

2.0.7 leachate detection layer

Layers of material used to test the reliability of double-layer containment systems in landfills.

2.0.8 anti-seepage system engineering material liner system engineering material

The general term for various materials used in anti-seepage system engineering, including high-density polyethylene (HDPE) geomembrane, sodium-based bentonite waterproof blanket (GCL), geotextile, geocomposite drainage network, geotechnical filter, pebbles, high-density polymer Ethylene (HDPE) pipes, high-density polyethylene (HDPE) pipe fittings, high-density polyethylene (HDPE) ball valves, etc.

2.0.9 leachate head

Taking the bottom surface of the drainage layer as the reference plane, the water head corresponding to the maximum pressure of leachate in the drainage layer.

2.0.10 single liner structure single liner structure

An anti-seepage structure composed of an anti-seepage system engineering material and a base layer.

2.0.11 single layer composite liner

The anti-seepage structure is composed of two or more anti-seepage materials closely connected.

2.0.12 double liner structure double liner structure

It consists of two anti-seepage layers, and an anti-seepage structure with a leak detection layer between the two layers.

3.1 General provisions

3.1.1 Materials used in anti-seepage system engineering of landfills may include clay materials and geosynthetic materials. The soil materials used in the construction of the compacted clay anti-seepage layer shall meet the following requirements.

- 1 The dry weight of soil particles with a particle size less than 0.075mm should be greater than 25% of the total dry weight of soil particles;
- 2 The dry weight of soil particles with a particle size greater than 5mm should not exceed 20% of the total dry weight of soil particles;
- 3 The plasticity index should range from 15 to 30.

3.1.2 Geosynthetics used in landfills can be high-density polyethylene (HDPE) geomembrane, geotextile, bentonite waterproof blanket (GCL), geotechnical composite drainage net geotechnical filter, high-density polyethylene (HDPE) pipes, etc.

3.2 High-density polyethylene geomembrane

3.2.1 The high-density polyethylene geomembrane used in the landfill anti-seepage system project shall comply with the relevant provisions of the current industry standard "High-density polyethylene geomembrane for landfill" CJ/T 234, and shall also Meet the following requirements.

- 1 The thickness of the film should not be less than 1.5mm;
- 2 The width of the film should not be less than 6.0m.

3.2.2 When the anti-seepage requirements are strict or the height of the garbage pile is greater than 20m, a high-density polyethylene geomembrane with a thickness of not less than 2.0mm should be selected.

3.2.3 The appearance requirements of high-density polyethylene geomembrane shall comply with the provisions in Table 3.2.3.

3.3 Bentonite waterproof blanket

3.3.1 The bentonite waterproof blanket used for landfill anti-seepage system engineering should use sodium-based bentonite waterproof blanket, and can choose natural sodium-based bentonite waterproof blanket or artificial sodium-based bentonite waterproof blanket. In addition to the relevant provisions of the current industry standard "Sodium Bentonite Waterproof Blanket" JG/T 193, the selected sodium bentonite waterproof blanket should also meet the following requirements.

- 1 The mass per unit area should not be less than 5000g/m²;
- 2 The volume expansion of bentonite should not be less than 24mL/2g;
- 3 The tensile strength should not be less than 800N/100mm;
- 4 The peel strength should not be less than 65N/10cm;
- 5 The permeability coefficient should be less than 5x10⁻¹¹m/s;
- 6 Anti-hydrostatic pressure 0.4MPa/1h, no leakage.

3.3.2 The powder-type bentonite waterproof blanket or granular bentonite waterproof blanket should be selected according to the anti-seepage requirements. In projects with high anti-seepage requirements, the powder-type bentonite waterproof blanket should be selected first.

3.3.3 The flatness of bentonite should be ensured and soil shortage should be prevented.

3.3.4 The bentonite waterproof blanket in the landfill anti-seepage system project should have a smooth surface, uniform thickness, and no holes or broken edges. The needle punching of acupuncture products should be uniform and dense, and there should be no residual broken needles.

3.4 Geotextiles and Geofilters

3.4.1 All kinds of geotextiles and geotechnical screens used in the anti-seepage system engineering of landfills shall comply with the current relevant national standards.

3.4.2 Non-woven geotextiles should be used for the protective layer of high-density polyethylene geomembrane, which should meet the requirements of the current industry standard "Nonwoven Geotextiles for Landfills" CJ/T 430, and the specification should not be less than 600g/m².

3.4.3 Geotextile or geotechnical screen can be used as filter material for blind ditch and