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Methods of Corrosion Protection of Water Pipes, Chemical Reagents and Scientific Bases of Protection

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May be secret, they adversely affect the performance of pipes, so these factors should be taken into account when choosing materials. Pipes must be corrosion resistant. Proper selection of pipe materials and each of their top and inner linings, taking into account the exact construction and operating conditions, will extend their service life and reduce the cost of operation.

The roughness of the inner surface of the pipes has a certain effect on the power used to drain the water. Therefore, the inner surface of the pipes should be smooth and not change during use. This figure depends on the material of the pipe, the technology of its preparation, whether the inner lining of the pipe as a drain.

The depth of the pipes is determined by the longitudinal section of the network.

The depth of the pipes can be increased or decreased depending on the conditions of the site. The minimum depth of the pipes is set based on the following three conditions:

1. To prevent freezing of the pipes;

2. Do not allow external weights to damage the pipes;

3. Ensure that networks coming from neighboring neighborhoods and sidewalks are connected.

The temperature of wastewater in winter is not less than 7-100 C.

In sandy and loamy soils, the standard freezing depth is assumed to be 1.2.

In order to reduce erosion in underground heat pipes, it is necessary to avoid cutting them with various underground currents, to avoid carrying them through swamps, to avoid laying them in places where water is often flooded, and to avoid laying them in contaminated lands.

In the areas of industrial organizations, the heating network pipes are laid together with other production pipes on special technical roads separated from the impassable part of the site.

The heat chambers used in the pipes should use as little water as possible so that their value does not increase when the pipes are laid underground. The base of the pipes can be artificial or natural.

When choosing the foundation for the laying of pipes, it is determined by the type of soil of the site and the material of the pipes to be laid and the method of their connection. One of the main requirements when digging a trench for laying sewer networks is to keep the soil structure 20-30 cm thick of the soil under the trench intact. This layer is excavated shortly before laying the pipes and the pipe is laid.

If earthworks are carried out in winter on fertile soils, measures should be taken to protect the soil under the trench from freezing, or to remove the frozen soil under the trench before laying the pipes and replace it with a sand-gravel base. The thickness of this new foundation will be determined as specified in the design. If the bottom of the trench is made of hard rock, then a 20 cm thick cushion should be laid under the pipe.

Soils with high moisture content of artificial foundations under the pipes - wetlands, muddy soils in the project In some cases, it is possible to create an artificial base of gravel along the entire length of the trench to prevent the pipes from sinking when laying pipes in weak soils.

When spool, concrete or reinforced concrete pipes are laid in soils that return water well in water-saturated soils, its base can be made of concrete.

The criteria for reliable and efficient use of metal pipes are mainly determined by their degree of corrosion protection. Internal corrosion increases the roughness of the inner surface of the pipes as they rupture due to corrosion, resulting in a decrease in the water permeability of the pipes. In some cases, their hydraulic resistance can be 8-9 times higher. All this reduces the service life of water supply networks. It will cost extra to repair, re-install and bring in additional pipes.

Cast iron and steel pipes are metal pipes. Two types of pipes are used for pressure water supply networks. In order to connect the pipes made of brown cast iron in a runaway and semi-continuous manner, the mouths of one side are made wider and they are fastened with a compaction rope and asbestos-cement mixture. Their diameter is 65 - 1000 mm. will be

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The diameter of the pipes is 65-300 mm, length 6-6 m, diameter 450 mm. and older ones 5 to 10 m in length; will be They are produced in three different thicknesses.

Pipes LA, A and B differ from each other in the thickness of their surroundings and therefore can withstand any pressure.

They can be used to install the necessary fittings and water supply points in water pipes. In the absence of cast iron devices, steel welded devices may be used. The disadvantage of cast iron pipes is their breadth of resistance to dynamic loads. In nature, cast iron pipes are widely used in water supply systems because they are resistant to large loads and have good flexibility. Cast iron pipes require more metal than steel pipes. However, the use of cast iron pipes, their internal cavity and durability are also limited. Steel pipes are produced in a wide range.

They are high strength, flexible and can be installed industrially. Disadvantages of steel pipes - non-corrosive, can grow various substances on the inside, have a shorter service life than cast iron and mirror pipes, lead to an increase in hydraulic resistance during use, if appropriate measures are not taken.

In particular, nickel, chromium and other metals are used in the manufacture of high-quality thick, straight welded and twisted welded pipes from low-alloy steel.

Pipes and channels used for sewage discharge must meet certain requirements: strength-resistant, hydraulic requirements.

The strength of the pipes is said to be able to withstand external loads and internal pressure days.

External forces are generated from the external mass of the vehicle. The internal forces depend on the mode of operation of the network and must withstand the increase in pressure in the event of blockages in the pipes, the pressure in the pressure conductors and the ducts. The economic costs of metal corrosion are enormous, for example, as much as a quarter of the world's steel is produced in a year, 1/4 of it is lost due to corrosion.

Therefore, one of the main tasks today is to study the corrosion process in depth, to understand its mechanisms and to find, create and apply various inexpensive means to combat it chemistry a type of corrosion called gaseous corrosion, in which a person is severely damaged by atmospheric oxygen in metals. As the temperature rises, the rate of oxidation of most metals increases dramatically.

For example, iron forms a visible film of base oxides at 250-3000C. Surfaces of metals at 6000C and above are different oxides of iron: FeO; Fe2O4; It is covered with a layer of anthracite consisting of Fe2O3. Burning cannot protect the iron from subsequent oxidation because it has cracks and pores that facilitate the passage of oxygen to the metal. Therefore, when iron is heated above 800C, its oxidation rate is greatly increased.

Chemical corrosion is the result of the interaction of a metal with chemically active substances. Some cases of chemical corrosion are corrosion of gases (hydrogen, carbonyls, oxygen, hydrogen sulfide, and in some cases from the atmosphere). The production of ammonia, methanol, and other similar substances is subject to corrosion by hydrogen and carbonyls. The hydrogen molecule, especially its atom, is very mobile and easily penetrates the metal, resulting in an internal stress in the metal as a result of a chemical reaction. For example, hydrogen reacts with steel cementite to displace methane

$$Fe_3C + 2H_2 = 3Fe + CH_4$$

To displace methane Causing microcracks at the metal particle boundary.

Methods of Corrosion Protection of Pipes

The problem of corrosion protection of metals arose with the introduction of metals. Corrosion processes are related to the laws of nature that we cannot change. However, by studying these laws, we can reduce the harmful effects of corrosion. Methods of corrosion protection follow from its definition.

Corrosion decomposition of oil industry equipment is determined by the physicochemical properties of water and hydrocarbon parts of the system, their composition, quantitative ratio, the presence of dissolved gases (hydrogen sulfide, carbon dioxide, oxygen, etc.). In high-velocity flow, the phases mix intensively to form an emulsion-type water-oil mixture. When they stop, two separate phases are formed. In all cases, the corrosive medium is water.

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