

ICHIMLIK SUVLARINI ZARARSIZLANTIRISHDA MEMBRANALI ULTRAFILTRATSIYA USKUNALARIDAN FOYDALANISH

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Annotatsiya. Ushbu maqolada, ichimlik suvini zararsizlantirishda membranali ultrafiltratsiya qurilmalardan foydalanish afzalligi hamda erishiladigan yuqori samaradorlik yoritib berilgan. Bugungi kunda aholini toza va sifatli ichimlik suvi bilan ta'minlash dolzarbligi ortib borayotgan vaqtda, ichimlik suvlarini zararsizlantirishda energiya tejankor va samaradorlik effekti yuqori bo'lgan texnologiyalarni suv ta'minoti tizimlarida qo'llash eng maqbul chora-tadbir bo'lib qolmoqda.

Kalit so'zlar: zararsizlantirish, ultrafiltr, membrana, gidravlik yuvish, boshi berk tizim.

ИСПОЛЬЗОВАНИЕ МЕМБРАННОГО УЛЬТРАФИЛЬТРАЦИОННОГО ОБОРУДОВАНИЯ ДЛЯ ДЕЗИНФЕКЦИИ ПИТЬЕВЫХ ВОД

Аннотация. В данной статье освещаются преимущества использования устройств мембранной ультрафильтрации при обеззараживании питьевой воды и достигаемая высокая эффективность. На сегодняшний день, когда возрастает актуальность обеспечения населения чистой и качественной питьевой водой, применение энергосберегающих и высокоэффективных технологий в системах водоснабжения для обеззараживания питьевой воды остается наиболее оптимальной мерой.

Ключевые слова: дезактивация, ультрафильтр, мембрана, гидропромывка, тупиковая система.

USING MEMBRANE ULTRAFILTRATION EQUIPMENT FOR DRINKING WATER DISINFECTION

Abstract. In this article, the advantage of using membrane ultrafiltration devices in the decontamination of drinking water and the high efficiency that can be achieved are highlighted. Today, when the importance of providing the population with clean and high-quality drinking water is increasing, it is necessary to use energy-saving and high-efficiency technologies in the decontamination of drinking water. use in water supply systems remains the most appropriate measure.

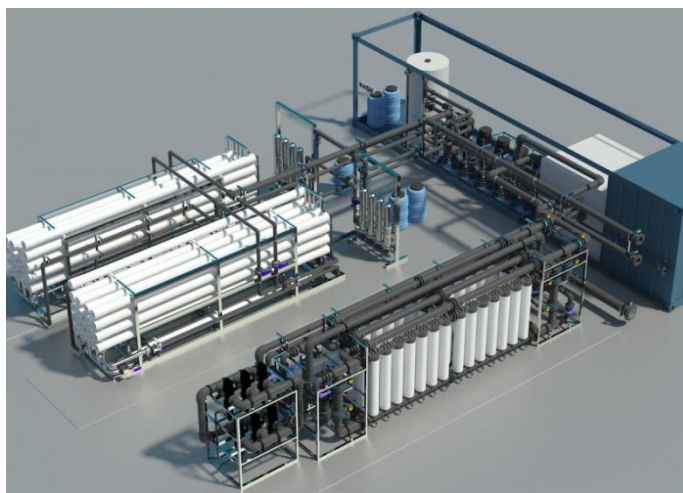
Keywords: decontamination, ultrafilter membrane, hydraulic washing, closed system.

KIRISH

Ultrafiltratsiya qurilmalarining ishlashida muhim vazifa membranalarda ifloslantiruvchi moddalarning to'planishi jarayonini nazorat qilish va boshqarishdir. Ushbu muammoni hal qilish, birinchidan, membrana ifloslanishi minimal bo'lgan membrana qurilmalarining ishlash rejimini yaratishdan, ikkinchidan, ma'lum bir manba suvining ifloslanishiga eng kam sezgir bo'lgan mos membrana materialini tanlashdan iborat.

TADQIQOT MATERIALLARI VA METODOLOGIYASI

Bundan tashqari, membrana elementining dizayni o'zi membranani maksimal samaradorlik bilan gidravlik yuvish imkonini berishi zarur.



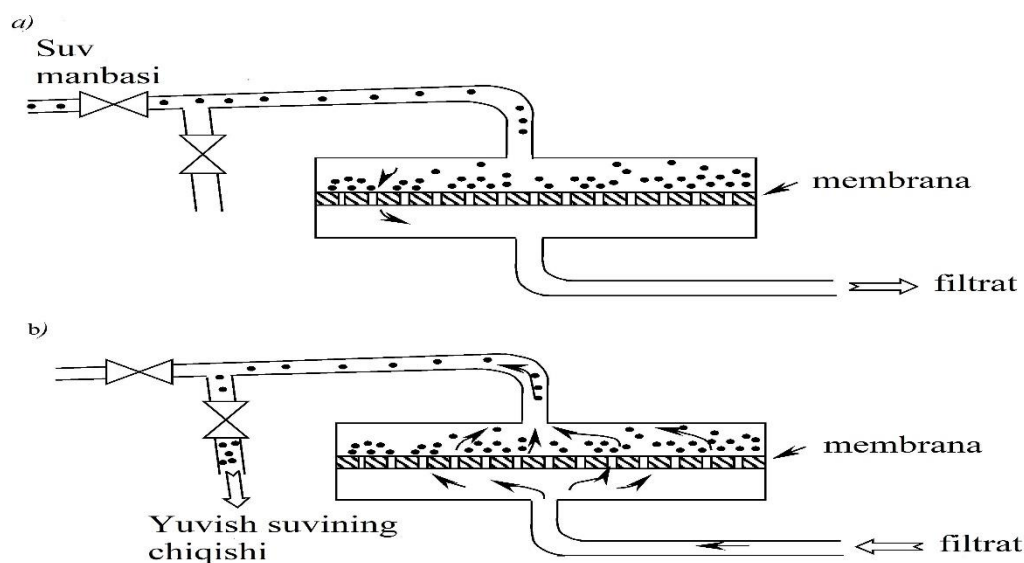
1-rasm.

Ultrafiltratsiya blokining umumiy ko'rinishi

Membrana yuzasi ustidagi cho'kindi o'sishiga qarshi kurashish uchun tozalangan suyuqlikdan qo'shimcha oqim hosil bo'ladi, bu esa to'plangan cho'kindini xiralashtiradi. Membrananing yuzasidan chiqarilgan ifloslantiruvchi moddalarni o'z ichiga olgan suyuqlik (konsentrat) ajratish qurilmasidan chiqariladi.

TADQIQOT NATIJALARI

Ifloslantiruvchi moddalarni sirdan va membrananing teshiklaridan samaraliroq olib tashlash uchun teskari yuvish usuli qo'llaniladi, bunda tozalangan suv (filtrat) filtrlash yo'nalishiga teskari yo'nalishda membrana orqali o'tkaziladi. Bunday yuvishlar donador yuklanish bilan an'anaviy filtrlarni yuvishdan ko'ra tez-tez amalga oshiriladi - yer usti suvlarini tozalash uchun mo'ljallangan ultrafiltratsiya membranalari uchun ularning chastotasi soatiga 1 dan 4 martagacha o'zgarib turadi, lekin yuvish davomiyligi atigi 10-60 sekund, shuning uchun chiqarilgan suv hajmi filtrat hajmining 5% dan oshmaydi. Ultrafiltratsiya membranalari yordamida suvni tozalash jarayoni sxemasi 2 - rasmda ko'rsatilgan .



2-rasm.

Ultrafiltratsiya qurilmalarini ishlashning asosiy sxemalari

a - ish aylanishi (filtrlash); b - yuvish davri.

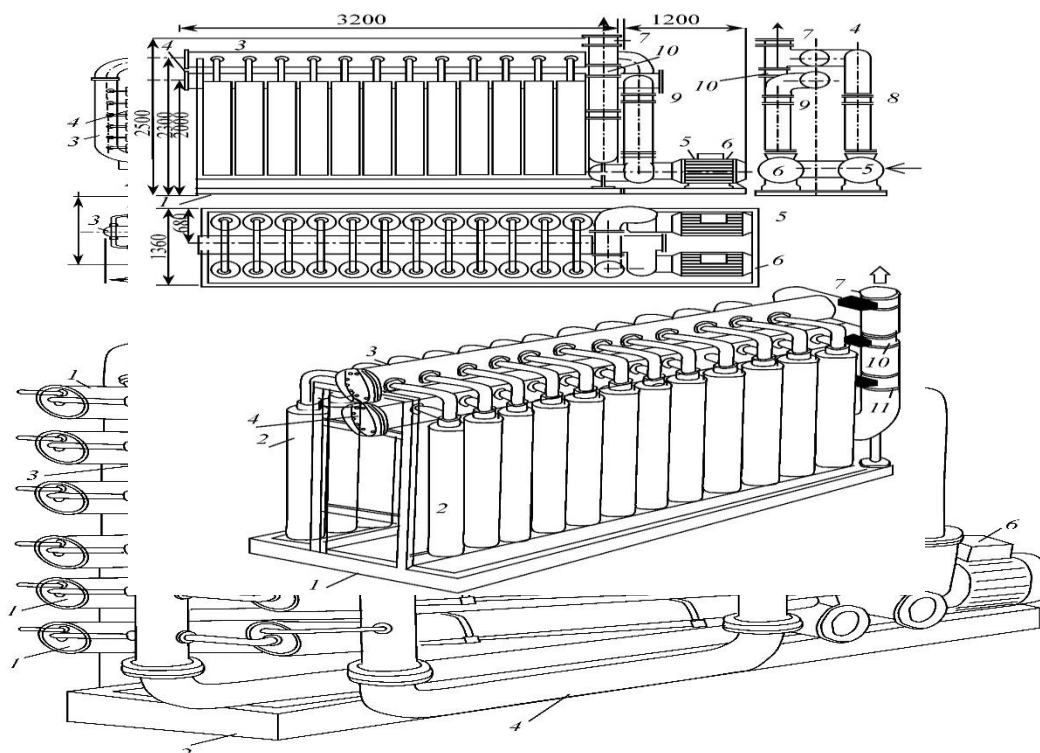
Ko'pgina zamonaviy polimerik membranalar mikroorganizmlarga va kimyoviy birikmalarga 2 dan 11 gacha bo'lgan keng pH diapazonida chidamli (ba'zi membranalar kimyoviy yuvish paytida pH ning 1 dan 14 gacha o'zgarishiga imkon beradi), yuqori selektivlik va mahsuldorlikka ega, ammo kuchli oksidlovchi moddalar: erkin xlor, yod, ozon ni o'tkazmaydi. Membranalarning xususiyatlari butun xizmat muddati davomida faqat bir oz yomonlashadi, bu besh yil yoki undan ko'proq. Membrananing eskirishi tozalangan suv tarkibidagi to'xtatilgan va abraziv moddalar yoki kimyoviy tozalash vositalari bilan o'zaro ta'sirlashganda yuqori qatlamning yupqalashishi tufayli yuzaga kelishi mumkin. Cheklangan ish harorati 40-45 ° C ni tashkil qiladi, ba'zida 50 ° C gacha qisqa muddatli o'sishga ruxsat beriladi.

Boshi berk va o'zaro oqim rejimda ishlovchi ultrafiltrlarni taqqoslashda asosiy e'tibor tizimning foydali ishlashi va energiya sarfiga qaratiladi. Ma'lumotlarga ko'ra, boshi berk filtrli tizimlar uchun foydali ishlash mos ravishda 55-80 dan 90-98% gacha, o'zaro oqim rejimi uchun esa 75-90 dan 90-96% gacha va umuman olganda boshi berk rejimi yanada tejamkor. Muhim omil - bu elektr energiyasini iste'mol qilish: boshi berk filtrlash uchun u taxminan 0,18-0,22 kVt / m³ ni tashkil qiladi - bu o'zaro oqim bilan filtrlashdan ancha kam, - 0,54-0,72 kVt / m³.

Boshi berk rejimida ishlovchi ultrafiltratsiya membranasini qurilmasining ishlashi umumiy ma'noda quyidagi formula bilan tavsiflanadi:

$$Q = \frac{\Delta P * S}{\mu(R_m + R_q + R_{q.ch})} \quad (1)$$

Bu yerda : ΔP - membrananing ustidagi va ostidagi bosim farqi ; S - qurilmadagi membrana yuzasi ; μ – suvning dinamik yopishqoqligi ; R_m – membrana qarshiligi; R_q – uning teshiklari tiqilib qolishi tufayli membrananing qo‘shimcha qarshiligi; $R_{q.ch}$ – membrana yuzasidagi cho‘kindining qarshiligi.



3-rasm.

Bosimli idishlarda gorizontaal joylashtirilgan membranali membrana ultrafiltratsiya qurilmasining ko‘rinishi va joylashuvi: 1 – membranali apparatlar; 2 - ramka; 3 - tozalangan suv quvuri; 4 - manba suv quvuri; 5 - kir yuvish nasosi; 6 - besleme pompasi; 7 - elektr haydovchiga ega bo‘lgan eshik klapanlari.

MUHOKAMA

Tozalash tizimlari uch xil rejimda ishlaydi: doimiy transmembran bosimida, membrana orqali doimiy oqimda, o‘zgaruvchan bosim hamda oqimda. Membranali qurilmalarni yuvish yuvish nasoslari va elektr klapanlar yordamida tozalangan suvning teskari oqimi bilan amalga oshiriladi.

XULOSA

Membranli apparatlar, filtrli presslar va korpussizlar bundan mustasno, silindrsimon bosimli idishlarga joylashtiriladi. O‘rnatish dizayniga qarab, membrana elementlari vertikal yoki gorizontaal qatorlarda joylashgan (3 va 4 rasm).

4-rasm. 150 m³/ soat quvvatga ega membrana ultrafiltratsiya blokining ko‘rinishiga misol: 1 - ramka; 2 - korpusdagi membrana apparati; 3 - manba suvini taqsimlash quvuri; 4 – filtrat kollektori; 5 - besleme pompasi; 6 - yuvish uchun idish; 7-10 – elektr ochilib yopiluvchi zulfinlar.

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