



Obras Sanitarias del Estado



Compact and Transportable Water Treatment Plant

Uruguay

The Company



The Public Sanitary Works Administration (Obras Sanitarias del Estado - OSE), is a State-owned enterprise responsible for drinking water supply and waste water services (except at the capital city served by the municipality in the latter case) across the country: Oriental Republic of Uruguay.

OSE has gathered great experience in the last 130 years. The first running water service was inaugurated in 1871 by a private company and acquired in 1950 by the Uruguayan Government.

OSE is permanently facing new challenges in order to get solutions to improve its services, since society's needs have always been its priority.

The Oriental Republic of Uruguay has approximately 3.3 million inhabitants and the work OSE has performed allowed reaching 98% coverage of drinking water supply to the uruguayan population.

OSE serves the uruguayan population during the whole year, 24 hours a day, through 975.552 connections to an excellent quality drinking water distribution net.

Uruguay is the only country in Latin America that was not affected by Epidemic Cholera and other water-borne diseases.

This success is mostly a consequence of UPA units operation. At facilities where UPA units have been used, treated water volume has increased 53%.

The installation of about 110 UPA units all over the country and 102 UPA units at Central and South America, Asia and Africa, evidences their cost-effectiveness in sanitary, social and economic aspects.

Product Definition

The Autonomous Potabilization Unit (UPA) is a transportable plant which includes all the traditional processes. It is an effective and reliable water treatment plant which deals with a wide range of raw water qualities:

Turbidity 1 to 2,500 NTU

Color 0 to 300 Upt-Co

This device performs the drinking water treatment in order to obtain processed water in a stable way with turbidity values lower than 0.5 NTU and color values lower than 5 UPt-Co.

The quality of treated water satisfactorily meets drinking water standards of the WHO (World Health Organization), PAHO (Pan American Health Organization) and OSE-Uruguay.

| Rapid mixing | Flocculation | Sedimentation | Filtration |
|--|--|--|--|
| Occurs in the raw water entrance tube, in an area of high velocity gradients | Performed in two steps: first, the water is mechanically agitated in a single compartment; second, it passes through a hydraulic flocculation with alternating vertical plates | Upstream flow settler with plane parallel plates, inclined 60° from the horizontal | One high-speed downstream flow, at a constant rate through a sand layer filter |
| (Hole plate) | Retention time: 20 minutes | Surface load: 140 m ³ /m ² /d | Filtration rate: 7.5 m ³ /m ² /h |



Some applications

- To reduce or eliminate in the medium and short term unsolved water demand problems in water supply systems with production deficits (quality and quantity).
- To execute in very short terms safe drinking water production projects and works programs for a country, region or group of villages.
- To improve drinking water quality in existing facilities, through appropriately mixing drinking water produced by a UPA and old treatment plants.
- To substitute old treatment facilities (sedimentation and flocculation basins, filters, etc.), to allow rehabilitation and reconstruction works, while UPA units continue to provide drinking water service.
- To increase total production capacity in Existing Treatment Plants where old facilities have been rehabilitated.
- To reuse old facilities: fixed assets- structures (buildings, civil works, concrete structures, hydraulic installations, etc.) in new engineering projects. During the upgrading process, old facilities can be stopped because of UPA units' permanent production support, saving engineering project and civil works investment resources.
- To increase safe drinking water production systems flexibility in water supply systems combined with different water sources (ground and surface water).



Unit description

The unit is built with AISI 304 stainless steel, except for the external structural shapes (which are not in contact with water) and the external pipes (which are not welded to the unit, but mounted by flanges). All the steel pieces receive a special paint treatment that consists of sandblasting, a zinc epoxy base and finish painting.

The external part of the tank, also made of stainless steel, is painted for appearance. These characteristics guarantee an indefinite operational lifetime for the unit, and minimal maintenance work.

All complementary equipment, such as passageways, chassis for the engine-flocculator turbine reducer, pipelines, etc., can be removed, facilitating the unit transportation.

The valves required to operate the unit are butterfly type valves (Waffer), making the automation of the unit operation easier.

| Type | Flow Rate (m ³ /hr) | Weight (ton) | Dimension side | Width (m) | Length (m) | Height (m) |
|------------|--------------------------------|--------------|----------------|-----------|------------|------------|
| UPA 200T | 20 | 6 | Outside | 1.74 | 6.24 | 2.51 |
| UPA 200FD | 40 | | Inside | 1.50 | 6.00 | 2.50 |
| UPA 1000T | 70 | 25 | Outside | 3.10 | 12.18 | 3.26 |
| UPA 1000FD | 120 | | Inside | 2.75 | 11.76 | 3.00 |
| UPA 2000T | 140 | 40 | Outside | 3.90 | 18.40 | 3.26 |
| UPA 2000FD | 250 | | Inside | 3.50 | 18.00 | 3.00 |



UPA - Competitive Advantages

- **Uruguayan Government's warranty and OSE's technical support and know-how**

UPA units count on the Uruguayan Government's warranty and Obras Sanitarias del Estado (OSE) institutional support.

- **Investment optimization**

UPA units allow investment optimization through parallel plant operation.

- **Minimum maintenance costs**

UPA units have low maintenance requirements since they are manufactured in stainless steel.

- **Easy adaptability to a wide range of raw water qualities**

It is widely known that UPA units have demonstrated high adaptability to a wide range of raw water qualities in America as well as in Africa. They not only remove high turbidity and color concentration, but also eliminate bacteria, spores, viral pathogenic agents, parasite pathogenic agents, cysts, protozoan, phytoplankton - algae-, heavy metals and iron and manganese.

- **Rapid installation and functioning**

The possibility to transport UPA units and their components makes them especially appropriate for installation and start up in short terms (less than 7 days) in steady state operation or emergency situations.

- **Mobility of the investment**

UPA units allow geographic mobility and easy relocation of the investment.



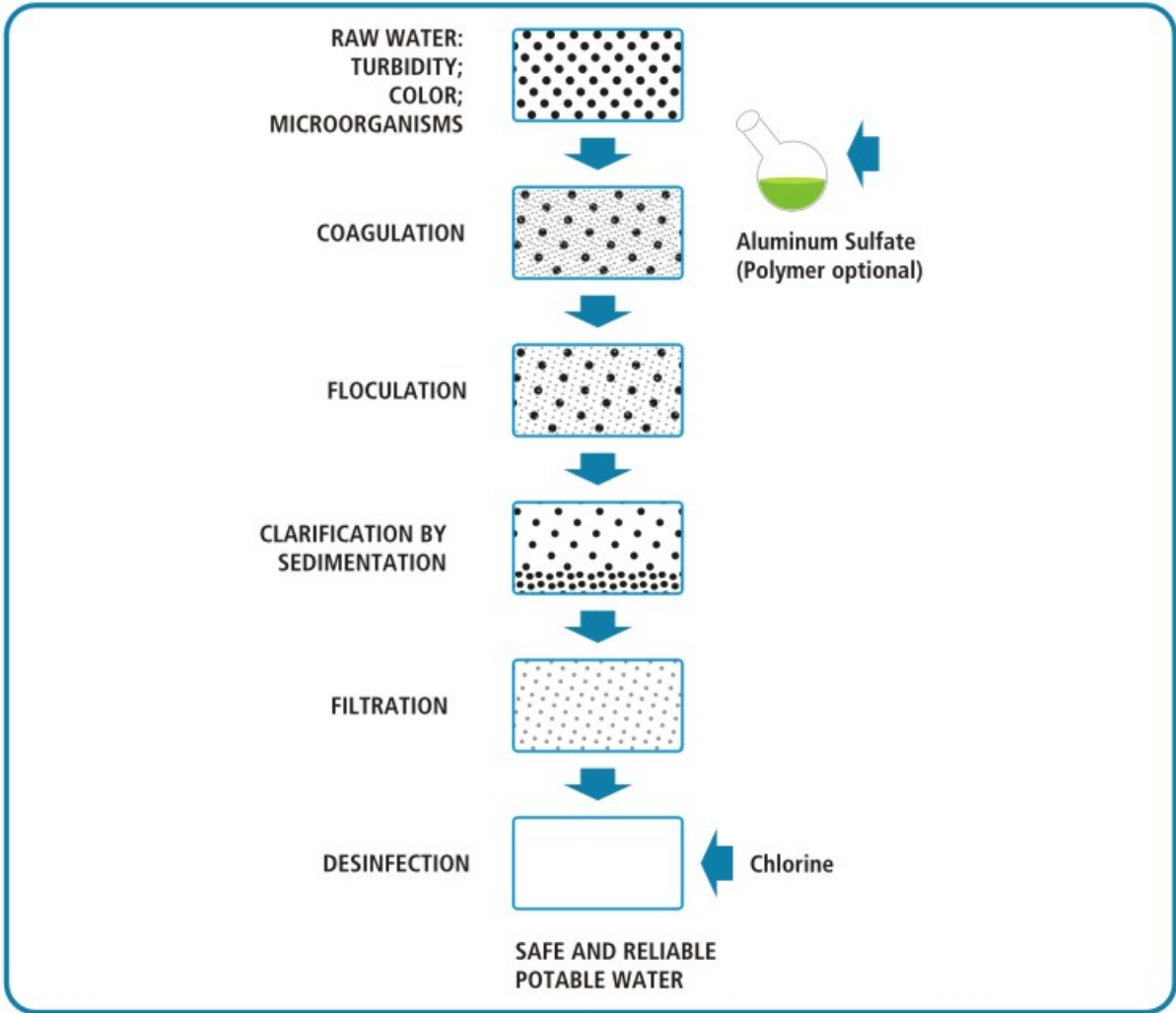
- **Transportability**

UPA units external dimensions and weight fit all kinds of international transport media (land, air or water).

- **Perfect adaptability to market**

UPA units perfectly adapt to market and technological conditions in different countries because of their simple operation and minimum maintenance requirements and technological conditions.





UPA donated

| | Model | Units | Year |
|---|-------|-------|------|
|  Honduras | 200T | 1 | 1998 |
|  El Salvador | 200T | 1 | 1998 |
|  Nicaragua | 200T | 1 | 1998 |
|  Venezuela | 200T | 1 | 1999 |
|  India | 200T | 1 | 2001 |
|  Iran | 200T | 1 | 2004 |
|  Iraq | 200T | 2 | 2004 |
|  Cuba | 200T | 1 | 2005 |
|  Peru | 200T | 1 | 2007 |
|  Ecuador | 200T | 1 | 2008 |
|  China | 200T | 1 | 2008 |
|  Bolivia | 200T | 1 | 2008 |
|  Cuba | 200T | 1 | 2009 |
|  Chile | 200T | 1 | 2010 |
|  Haiti | 200T | 2 | 2010 |


UPA Peace Missions

| | Model | Units |
|---|-------|-------|
|  Congo | 200T | 6 |
|  Haiti | 200T | 4 |

UPA marketed

| | Model | Units |
|---|-----------------|-------|
|  Argentina | 200T | 5 |
|  Ecuador | 200T/ FD | 15 |
|  India | 200T | 20 |
|  Venezuela | 2000T/ 200T/ FD | 34 |
|  Malaysia | 200T | 1 |

UPA installed in Uruguay

| | Units |
|---|-------|
|  Uruguay | 112 |

Nowadays, there are 112 plants operating in Uruguay and 102 plants operating in Central America, South America, Asia and Africa.

To date, OSE has commercialized 75 units. Moreover, 10 units are being operated in United Nations Peacekeeping Missions and Uruguay has donated 17 units to countries which have faced emergency situations caused by natural disasters.



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