

Macao

main storage reservoir (MSR) drinking water treatment plant



Macao Water is the only drinking water supplier, pipe network manager and customer service provider throughout Macao. Facing a series of challenges from the local water such as salt tide, water shortage, etc., Macao Water adopts world leading technologies and effective management and provides more than 550,000 Macao residents and 28 million tourists with drinking water which complies with European standard each year. The volume of water supplied by Macao Water each day is up to 330,000 m³.

SUEZ built in 1998 the Stage I of the Macao Main Storage Reservoir (MSR) Treatment Plant. This first stage was designed for a capacity of 60,000 m³/d and equipped with Mediazur technology.

In 2006, to face the increasing water demand of the inhabitants in the city of Macao, Macao Water awarded SUEZ for the design and construction of Macao MSR II Drinking Water Treatment Plant with an additional capacity of 60,000 m³/d. This plant is equipped with Aquadaf™ process followed by ultrafiltration membranes, thus enabling Macao city to benefit of the most compact water treatment technology ever installed in China.

In 2013, SUEZ has been awarded a new contract Macao MSR III, including the refurbishment of the existing plant and its extension with an additional capacity of 60,000 m³/d, to reach a total capacity of MSR facilities at 180,000 m³/d.

MSR III has the same raw water resource as MSR II's, which includes :

- LAPA reservoir (inlet river is Pearl River), located in mainland. A gravity pipe (DN 1200) was installed to introduce the raw water into MSR II and MSR III.
- MSR reservoir (seldom being used).
- Nanping reservoir (sometimes being used when there was not enough raw water from LAPA reservoir)



Macao MSR stage II process (60,000 m³/d)

pretreatment

Screening, followed by pre-chlorination and the additional of some hydrochloric acid (HCl) in order to lower the PH and injection of aluminum base coagulant

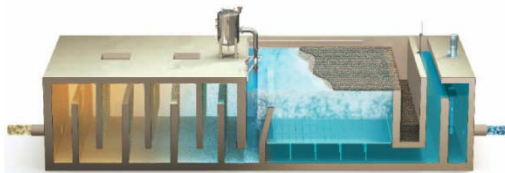
clarification

Clarification using Aquadaf™ dissolved air flotation technology : the coagulant and the raw water are introduced into the coagulation zone to neutralize the colloidal particles present in the water.

Once their loads are neutralized, the colloidal particles agglomerate by a system of agitation to form floc particles in the flocculation zone. This solid particles, agglomerated within the water, are then sent into the flotation zone where micro bubbles are dispersed. The floc attach to the air bubbles and float to the surface forming a thick bed of sludge.

- 2 Aquadaf™

Aquadaf™



a compact clarification solution, allowing higher flotation rates and reduced flocculation time

- saves space and limits nuisance
- versatility, economy and respect for the environment
- simplicity of operation and maintenance

disinfection by final chlorination

ultrafiltration

Ultrafiltration using Ultrazur™ membrane filtration system including out-in filtration, gravity-feed tanks, common peripheral water and air feed piping for all tanks.

- 5 lines of 3 cassettes with 90 modules each.



Ultrazur™ ZW1000

advanced clarification immersed ultrafiltration membranes

- Consistent quality of treated water
- Compact design for easy set-up and simple integration with existing systems
- Automated operation and possible increase in membrane surface area in the event of degradation of feed water quality





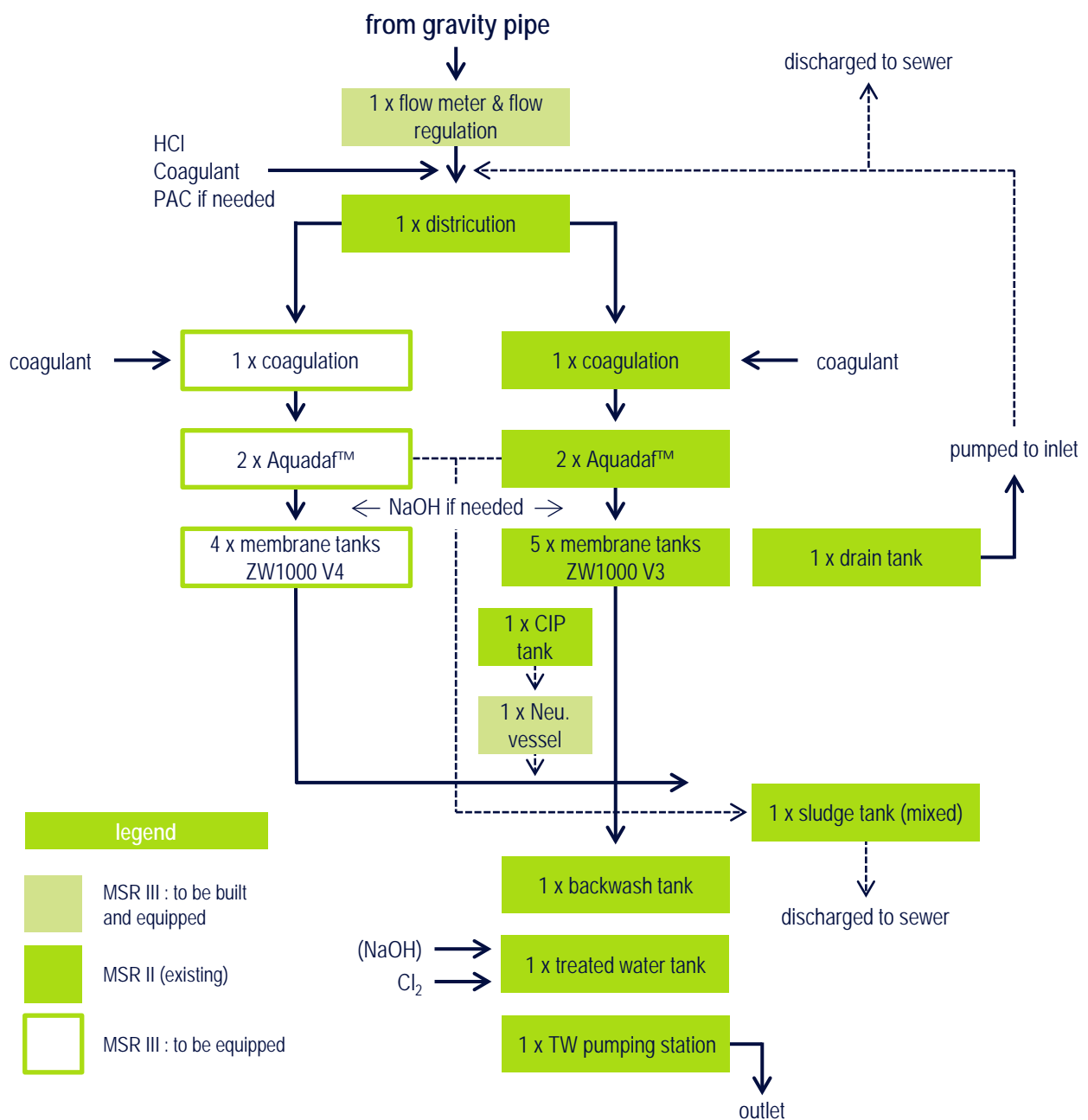
The civil works of MSR III had been completed during the construction of MSR II.

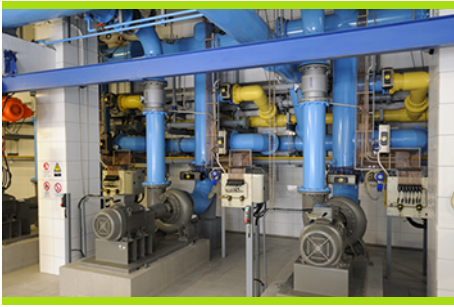
Macao MSR stage III process (60,000 m³/d)

As a part of MSR II's process design, the main treatment processes of MSR III was designed as same as MSR II's.

Additional equipment : 1 coagulation tank, 2 Aquadaf™, 4 lines of 3 cassettes with 90 modules each, 1 Neu. vessel

process diagram for MSR II and MSR III





stakeholders

Client :
**Macao Water Supply
Company Limited**

Construction :
SUEZ (100%)

key dates

- **MSR II**
contract signed in 2006 - completed in August 2008
- **MSR III**
contract signed in July 2013 - CW started in January 2014, start-up schedule in April 2015

other SUEZ's reference in Macao



Coloane Water Treatment Plant – 30,000 m³/d

First potable water treatment plant in Asia employed the Aquadaf™ flotation treatment process

Water Treatment Process :
coagulation, flotation, filtration, disinfection



www.degreмонт.com

Since March 2015, all the Group brands (Degrémont, Ozonia, Aquasource, Ondeo IS, Ameriwater, Infilco, Poseidon...) became SUEZ.

Meanwhile, from now on, the technologies and know-how of our Treatment Solutions offer will be distinguished with the label **degrémont®**.