Success history:

Aguilas desalt plant (Spain)

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CABLE TRAY SPECIALIST

Basorplast BPE

The Aguilas-Guadalentin desalt plant

Desalt station plant in Spain.

With a capacity of up to 7.4million ft3 / day, the Águilas-Guadalentín desalination plant complements the supply of the irrigation demands of the southern area of the Segura Basin, and of supply to the municipalities of Lorca and Águilas (Spain). The plant also has important distribution and pumping systems for different users and advanced systems for the diffusion and dissolution of brine in the sea, promoting environmental protection.

The treatment process consists of:
1st Pre-treatment by means of double filtration stage (by gravity and pressure)
2nd Reverse osmosis with double pass for boron removal
2nd Reverse osmosis with double pass for boron removal
3rd Energy recovery through isobaric chambers
4th Remineralization

Features:

- Type: Desalination plant
- Location: Águilas (Spain)
- Start of construction: March 2013
- Estimated investment: $256 Million
- Stations: 12
- Contractor: TUC Ferrovial + Sacyr + Cadagua + Sadyt

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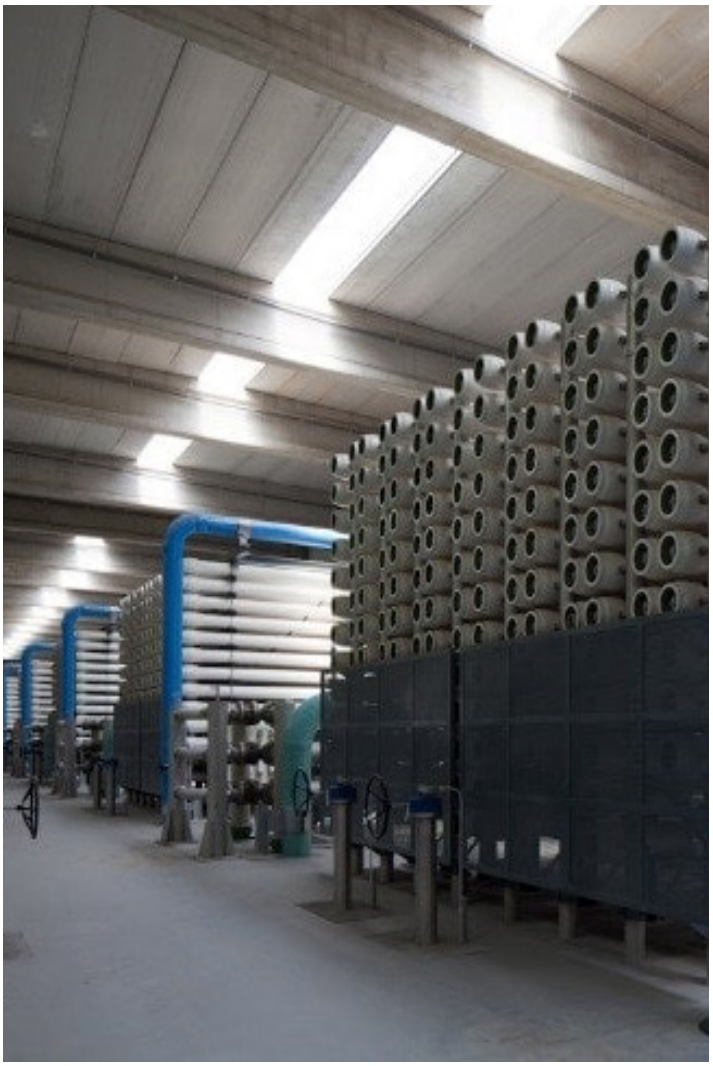


Aguilas/Guadalentin Desalination Plant
(Murcia)

Main contributions to the plant

1. Lower energy consumption

HIGH PRESSURE AND ENERGY RECOVERY SYSTEM

The Aguilas/Guadalentin desalination plant has one of the most highly optimised high-pressure systems in the world.

Basically, the innovations consist in converting a plant's high-pressure pumping system into a system containing two sets of equipment:

- ***Booster pump with high frequency driver***
- ***High pressure pump***

The installation has a DWEER-type fixed chamber energy recovery system. These exchangers are devices for transferring the high pressure from brine backflow to the seawater without converting it into rotary mechanical energy.

2. Water pre-treatment

LOW SPEED PRE-TREATMENT WITH LARGE GRAVITATIONAL FILTERS AND PRESSURISED FILTERS

Gravity filtering

In order to effectively eliminate solids suspended in seawater, the first filter stage is performed on a bed of anthracfite (0.8m), and then sand (2.62 FT) over a gravefl under-flayer (0.32 FT). The desfign comprfises two flfines, each wfith 10 fi flters wfith fi flter beds of 183 x 123 FT2 gfivfing a unfit area of 2110 FT2.

Pressure filtering

The gravity-filtering phase is followed by pressure filtering in order to virtually guarantee the elimination of suspension solids from the seawater.

3. Water Quality

BORON REMOVAL DURING THE SECOND PASS

A fraction of the 60-80 % permeate produced in the first pass will be sent to a second, partial, pass with 90% conversion that will act as a boron content regulator. This way, and after it has been mixed with remaining flowing water, the boron content obtained is less than 0.5 ppm within the temperature range as designed. The backflow generated in this second pass will be recirculated and mixed with intake water, achieving an overall conversion of 43.5%.

The fi flter beds have a flayer of sfiflfica sand (2,13 FT) fofIflowed by a flayer of garnet (0,82 FT) and then gravefl (0.65 FT).

GENERAL TABLE

Current status	Under Construction
Maximum production	6391954,68 ft³/day (extensfibfle to 7486709,34 ft³//day)
Benefited population	130,000 inhabitants
Irrigated land in hectares	9,600 Hectares
Desalination process	Reverse osmosis
Number of Reverse Osmosis frames	12 (+2 future) 1st pass / 5 (+1 future) 2nd pass
Number of high pressure racks	12
Type of intake	Open fintake. 18FT dfiameter underwater cyflfindrficafl refinforced concrete tower. Tower hefight fis 16 FT wfith 58 FT deep foundatfions. Intake fis through sfix 4,92 FT-hfigh cubficafl ceflfls flocated on the upper part of the tower. Pump Statfion I – At Saflfinares: 4+1 eflements. Hm=721 FT.
Desalinated water pumps	PS I – to the Mancomunfidad de flos Canafles defl Tafibfiflfla.: 3+1 eflements. Hm=164FT. PS I – To Aflto Guadaflentín, 1st Step: 11+1 eflements. Hm=591 FT. PS II – To Aflto Guadaflentín, 2nd Step 9+1 eflements. Hm 476 FT . PS II - To CRR at Águfiflas: 1+1 eflements. Hm=146 PS II - To CRR at Puflpl: 2 + 1 eflements. Hm=160FT
Pump pipe	11,468 m - Steel – DN 1,200 mm; 5,524 m - Steel – DN 1,000 mm; 1,190 m - Ductile cast – DN 350 mm 890 m - HDP DN 1,200 mm
Outfall pipe	2,867 m - HDP DN 1,400 mm PN 6 SDR 26 (53.5) 225 m - Reinforced concrete jacked pipe (RC) DN 2,000 mm Stretch on land:
Intake pipe	730 m of GRP DN 2,200 mm PN 10; 2,880 m of GRP DN 2,200 mm PN 6; 42 m – RC jacked pipe DN; 3,000 mm /157 m – RC jacked pipe DN 3,000 mm; Underwater Intake: 510 m - HDP DN 2.200 mm type KRAH SDR 26; 401 m – POLYCRETE jacked pipe DN 2,400 mm
Regulator tank	In plant - 1 of 15,000 m³; In PS II - 1 de 2,900 m³ Reservoir Cerro Colorado (+365 m) 121,000 m3
Total installed capacity	64 MW
Concession period	15 years
Investment	290.000.000 usd
Financing from European funds	58.000.000 usd
Investment	
Desalination Plant	264.000.000 usd
Distribution pipelines	21.000.000 usd
Distribution capacity	
Cubic metres per day	212,000 m³/day.
Cubic hectometres per year	70 hm³/year
Energy data	
Electric power (kW)	56,70 MW
Voltage	132 kV
Specific energy consumption	4,623 kWh/m³ (excluding distribution)
Pretreatment configuration	20 open filters 42 in steel and 2 in GRP 24 in GRP
Reverse osmosis rack configuration	
Membrane type	8" x 40" spiral-wound membrane
Number of passes	2
Number of stages	1 stage in 1st pass and 2 stages in 2nd pass
Vessels and membranes per pass and stage	1º pass: 190 vessels*12 racks *7 elements. = 15,960 membranes. 2nd pass 1st stage: 86 vessels * 5 racks * 7 elements. = 3,010 membranes. 2nd pass 2ª stage: 30 vessels * 5 racks * 7 elements = 1,050 membranes.
Post-treatment configuration	Slaked lime with lime saturator + CO2 + hypochlorite

Participating companies:

Building was awarded to the TBA comprising Ferrovial-Sacyr-Cadagua-Sadyt.

Pre-treatment and post-treatment engineering developed by Sadyt and Cadagua developed the reverse osmosis process, from basic engineering to start-up, including the supply of the equipment and the plant's coordination and setting up.

Technical assistance in Project Management by Inypsa.

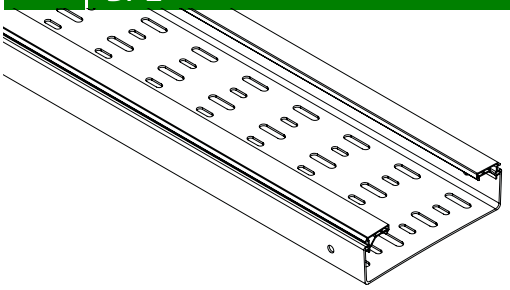
Plant operation was outsourced to the TBA for 15 years.

BASORPLAST BPE

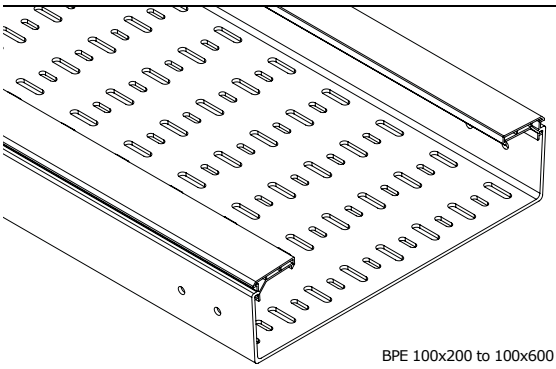
UL 568

DATA SHEET INSTALLED PRODUCT

BPE



BPE 60x100 to 60x300



BPE 100x200 to 100x600

Size conversion	
mm	inch
60X100	(2"3/8 x 4")
60X150	(2"3/8 x 6")
60X200	(2"3/8 x 8")
60X300	(2"3/8 x 12")
100X200	(4" x 8")
100X300	(4" x 12")
100X400	(4" x 16")
100X600	(4" x 24")

Models (HxB):
60x100; 60x150; 60x200; 60x300; 100x200; 100x300; 100x400; 100x600.

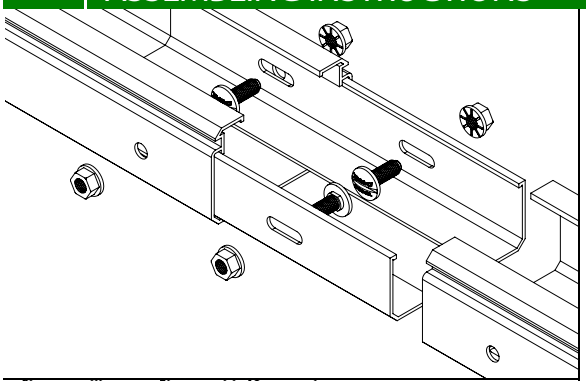
Types: Slotted or solid bottom.

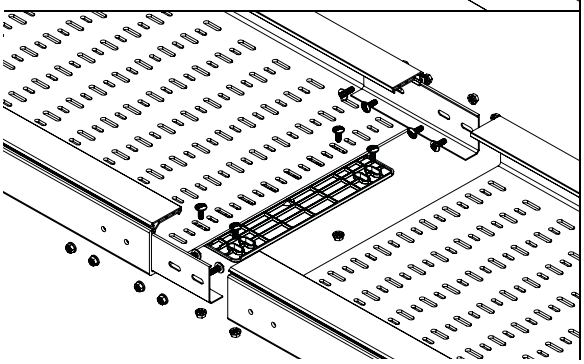
Finishes: PVCM1 UV RAL 7035

Characteristics of the tray:

- Non metallic system
- Resistant to UV radiation. Excellent behaviour in outdoor installation.
- Impact Strength: 20J, except 60x100 with 10J
- Minimum temperature: -4 ºF
- Maximum temperature: 140 ºF
- Non-flame propagating component
- Without electrical continuity
- Electrical insulating component
- Dielectric Strength 18 +/- 2 kV/mm
- Hight protection inside and outside against corrosive substances
- Plastic system resistant to humidity/salty and chemical environments according to DIN 8061 and ilSO/TR 10358
- M1 reaction to fire acc. to UNE 23727
- Glow wire test degree 1760 ºF, EN 60695-2-11
- Flammability UL 94-VO, ANSI/UL 94-1995
- Limiting Oxigen Index LOI>50%, EN ISO 4589
- Comply with RoHS directive, 2011/65/UE
- Raw material without silicone

ASSEMBLING INSTRUCTIONS





- For the assembly, two union joints and four M8 Bolt sets are needed for each stretch (8 for H100 models). For trays with a width ≥ 400 mm it is necessary to use the JUBPE-C base joint to acomplish the requirements of full load transverse arrow indicated by IEC 61537. This union requires 4 screw set CTBP M8 PVC, and it can be placed inside or outside the cable tray.
- Tray installation for electrical systems should NOT run under other types of canalisations such as water, vapour or gas canalisations.
- To guarantee a good ventilation, we recommend installing the trays keeping a minimum distance of 250 mm between each tray.
- Suitable for wet, salty and chemical agresive enviroments.
- To assure good performance under expansions , the increase in temperature must be noted, between the installation and the maximum temperature expected. Depending on the expected growth in the temperature (ΔT) leave a gap (h) between cable trays according to the following table :

ΔT (ºF)	h (mm)
68	5
86	7
104	9
122	11

TESTS RESULTS ACCORDING TO UL 568

- Safe working load:

SWL values for 104 ºF

NEMA classification	MODEL	Safe Working Load - kg/m (lb/ft)		
		2,4 m (8 ft)	1,8 m (6 ft)	1,5 m (5 ft)
-	BPE-60x100	3,1 (2,1)	5,5 (3,7)	8 (5,4)
-	BPE-60x150	4,2 (2,8)	7,6 (5,1)	10,9 (7,3)
-	BPE-60x200	19,3 (13)	34,3 (23,1)	49,5 (33,2)
5AA	BPE-60x300	21,2 (14,2)	37,8 (25,4)	54,4 (36,5)
5A	BPE-100x200	33,1 (22,3)	59 (39,6)	84,9 (57,1)
8AA	BPE-100x300	52,4 (35,2)	93,2 (62,6)	134,3 (90,2)
8A	BPE-100x400	81,3 (54,6)	144,6 (97,2)	208,3 (140)
8B	BPE-100x600	121,7 (81,8)	216,5 (145,4)	311,7 (209,5)

SWL values for 140 ºF

NEMA classification	MODEL	Safe Working Load - kg/m (lb/ft)		
		2,4 m (8 ft)	1,8 m (6 ft)	1,5 m (5 ft)
-	BPE-60x100	2 (1,3)	3,6 (2,4)	5,2 (3,5)
-	BPE-60x150	2,7 (1,8)	4,9 (3,3)	7,1 (4,7)
-	BPE-60x200	12,6 (8,4)	22,4 (15)	32,2 (21,6)
-	BPE-60x300	13,8 (9,3)	24,6 (16,5)	35,4 (23,8)
5AA	BPE-100x200	21,6 (14,5)	38,4 (25,8)	55,3 (37,1)
5A	BPE-100x300	34,1 (22,9)	60,7 (40,8)	87,4 (58,7)
8AA	BPE-100x400	53 (35,6)	94,2 (63,3)	135,7 (91,1)
8A	BPE-100x600	79,3 (53,3)	141 (94,7)	203 (136,4)

NOTE: Tests according to UL 568 Method A (Load Before Destruction), with 1.5 Safety factor

- Water absorption: The absorption of water by the material is minor than 0.5 percent.

- Dielectric strength: There is no dielectric breakdown in the material after conditioning.

- Weathering: The material retain more than 75% of the original recorded flexural strength.

- Combustibility of cable tray assemblies: Not emit flaming or glowing particles or dropping particles that ignite the cotton layer situated below the flame application point

- Flame spread: Material meet a flame spread index lower than 25.

7,610 Feet

Sizes & quantities
60x150 (2"3/8x6"): 1,310 FT
60x300 (2"3/8x12": 1,170 FT
100x300 (4"x12"): 5,130 FT

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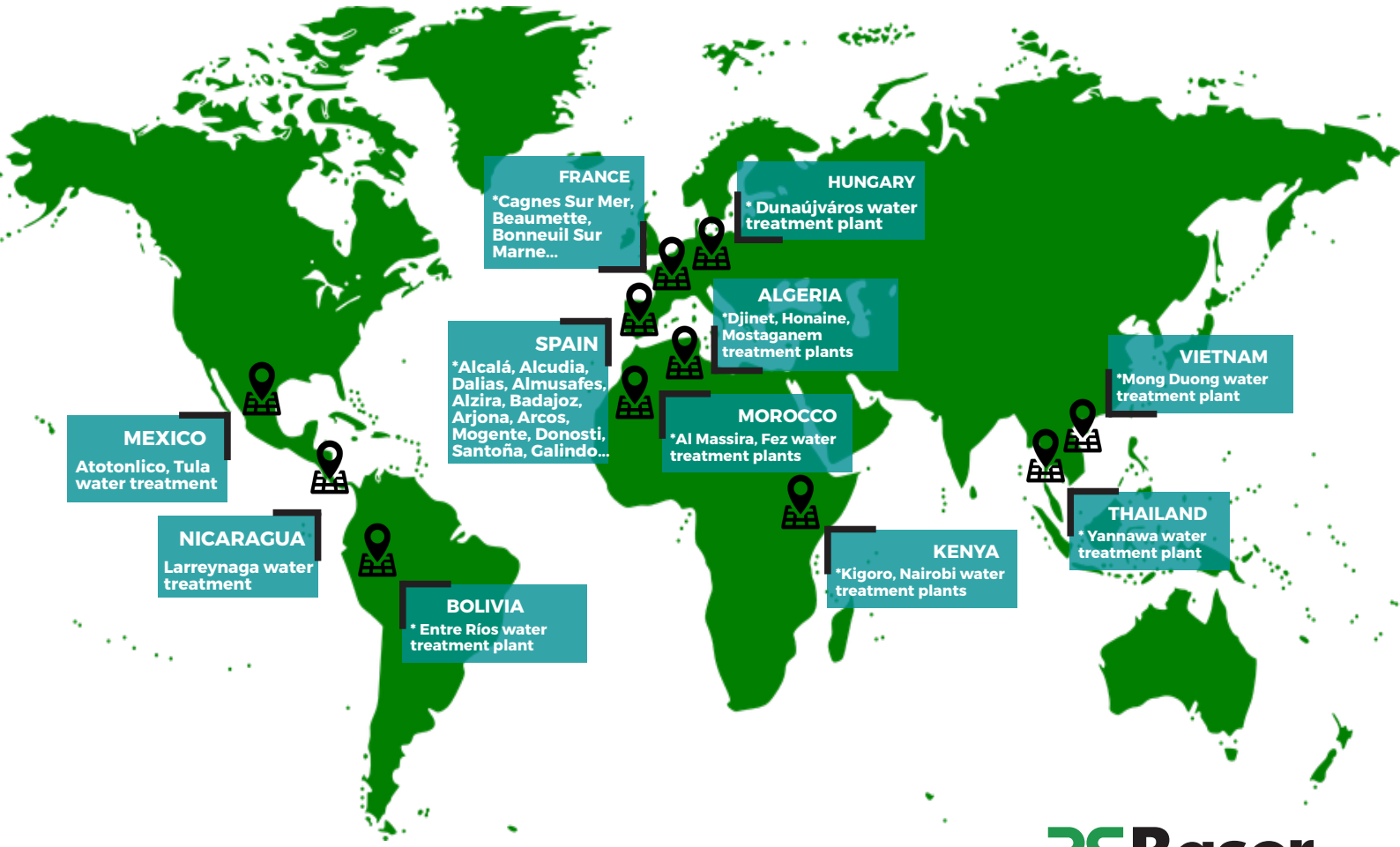
Desalt plants & water treatment plants

GLOBAL PROJECTS

TYPE	CITY	COUNTRY	NAME
Water treatment plant	Ali Mendjeli	Algeria	Ali Mendjeli water treatment plant
Desalt plant	Djinet	Algeria	Cap Djinet desalination plant
Desalt plant	Honaine	Algeria	Honaine desalination plant
Desalt plant	Mostaganem	Algeria	Mostaganem desalination plant
Wastewater plant	Bangkok	Thailand	Yannawa wastewater plant
Wastewater plant	Mong Duong	Vietnam	Mong Duong wastewater plant
Wastewater plant	Atontolico	Mexico	Atontolico de Tula sewage plant
Wastewater plant	Lerreynaga	Nicaragua	Larreynaga water treatment plant
Water treatment plant	Doukkala	Morocco	Al-Massira treatment plant
Water treatment plant	Alcalá de Henares	Spain	Alcalá de Henares Water Treatment Plant
Pumping station	Alcudia	Spain	La Alcudia pumping station
Desalt plant	Almería	Spain	Bajo Almanzora desalination plant
Desalt plant	Almería	Spain	Dalias desalination plant
Water treatment plant	Almusafes	Spain	Ford Factory Treatment Plant
Water treatment plant	Alzira	Spain	Alzira water treatment plant
Water treatment plant	Arcos de la Frontera	Spain	Arcos de la Frontera Water Treatment Plant
Water treatment station	Arjona	Spain	Arjona drinking water treatment station
Water treatment station	Badajoz	Spain	Badajoz drinking water treatment station
Water treatment station	Bétera	Spain	Bétera drinking water treatment station
Water treatment station	Buergos	Spain	Burgos drinking water treatment station
Water treatment station	Bullas	Spain	Bullas Drinking Water Treatment Station
Water treatment plant	Cáceres	Spain	Cáceres Water Treatment Plant
Desalt plant	Cádiz	Spain	Poniente desalination plant



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Desalt plants & water treatment plants

GLOBAL PROJECTS

TYPE	CITY	COUNTRY	NAME
Water treatment station	Fuente de Cantos	Spain	Fuente de León drinking water treatment
Water treatment plant	Gandia	Spain	Ull de Bou water treatment plant
Water treatment plant	Huesca	Spain	Huesca Water Treatment Plant
Water treatment station	Las Palmas de GC	Spain	Tamaraceite Drinking Water Treatment Station
Water treatment station	Menorca	Spain	Addaia Drinking Water Treatment Station
Pumping station	Mogente	Spain	Mogente pumping station
Water treatment station	Mohedas Granadilla	Spain	Granadilla drinking water treatment station
Pumping station	Oropesa	Spain	Oropesa pumping station
Desalt plant	Oropesa	Spain	Oropesa desalination plant
Water treatment station	Rejas	Spain	Rejas Drinking Water Treatment Station
Wastewater plant	San Sebastián	Spain	Donosti sewage tank
Pumping station	Santoña	Spain	Santoña pumping station
Water treatment station	Sestao	Spain	Galindo drinking water treatment station
Water treatment station	Sevilla	Spain	Carambolo drinking water treatment station
Water treatment plant	Somosaguas	Spain	Somosaguas Water Treatment Plant
Water treatment station	Talavera	Spain	Talavera drinking water treatment station
Desalt plant	Tenes	Spain	Ilanza desalination plant
Water treatment plant	Toledo	Spain	Navalcan treatment plant
Water treatment station	Toledo	Spain	Tefralux drinking water treatment station
Desalt plant	Torrevieja	Spain	Acuamed desalination plant
Water treatment plant	Valladolid	Spain	Valladolid Water Treatment Plant
Water treatment plant	Zambra	Spain	Aguas de Zambra water treatment plant
Pumping station	Al Massira	Morocco	Barrage Massira pumping station
Water treatment plant	Fez	Morocco	Autonomous water treatment plant
Wastewater plant	Tula	Mexico	Atotonilco wastewater plant
Water treatment plant	Kigoro	Nairobi	Kigoro Water Treatment Plant
Desalt plant	Aguilas	Spain	Aguilas Desalt plant
Piscina	Budapest	Hungary	Budapest Olimpic Pool
Wastewater plant	Cagnes Sur Mer	France	Cagnes Sur Mer wastewater plant
Water treatment plant	Tarija	Bolivia	Entre Rios water treatment plant
Water treatment plant	Kigoro	Kenya	Nairobi water treatment plant
Wastewater plant	Mostaganem	Algeria	Mostaganem sewage treatment plant
Wastewater plant	Beaumettes	France	Beaumettes wastewater plant
Wastewater plant	Dunaújváros	Hungary	Dunaújváros wastewater plant
Wastewater plant	Fez	Morocco	Fez sewage plant
Wastewater plant	Djineet	Algeria	Djineet wastewater plant
Water treatment plant	Bonneuil Sur Marne	France	Bonneuil Sur Marne treatment plant
Wastewater plant	Honaine	Algeria	Honaine wastewater plant
Water treatment plant	Ali Mendjeli	Algeria	Ali Mendjeli water treatment plant
Wastewater plant	Al Massira	Morocco	Al Massira sewage plant
Water treatment station	Villajoyosa	Spain	Villajoyosa drinking water treatment station

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