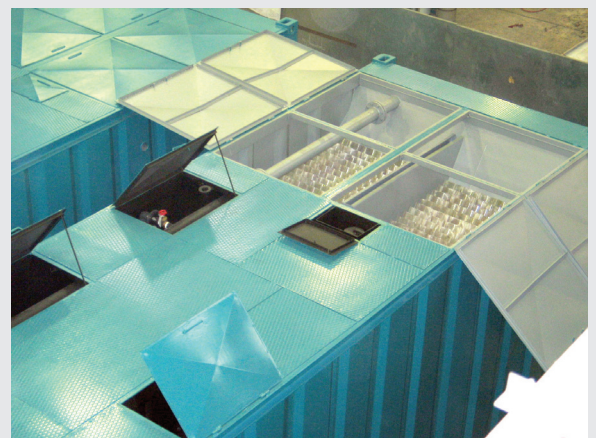




PACKAGE TYPE SEWAGE TREATMENT PLANT - ARP

Astim Package Type Sewage Treatment Plant has been developed to meet the wastewater treatment needs of small populations in most economic way and with easy operations. It has been designed to obtain high efficiency during the treatment. This design was produced by considering high quality technology with minimum cost and aiming to have maximum efficiency at the end of the operation. ARP units design have modular configuration and the system can be operated wherever requested. According to the increasing or decreasing of the population, different number of units can be taken into or out of the operation. ARP Package Sewage Treatment Plants with full aerobic activated sludge processes eliminate the odor nuisance and other disturbing problems of sewage. ARP units for municipal wastewater treatment are available with different capacities from 50 to 1000 people equivalent and can be easily applied in following places;

- School, hospital and military units,
- Accommodation Facilities and Restaurants,
- Holiday Resorts, Summer Villages, Camping Areas,
- Marina and harbor facilities,
- Construction sites,
- Small Communities,
- Rural Zones



ARP PLANTS WITH SEQUENCING BATCH REACTOR (SBR) PROCESS

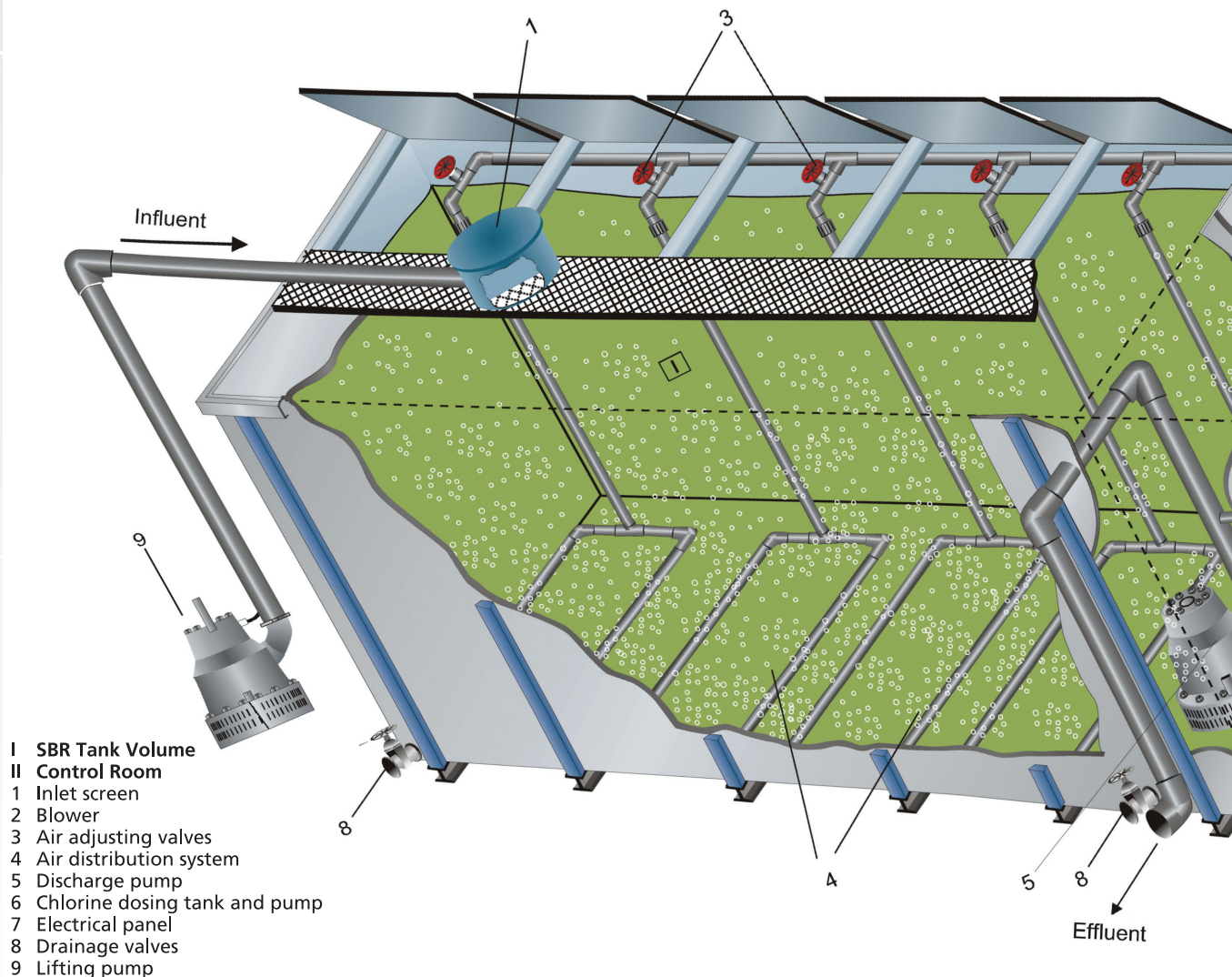
Wastewater flow may show fluctuations in various parts of the day; for example, during the night hours of the rural zones, industries without midnight shifts or due to seasonal changes of the needs. Considering these conditions SBR package treatment systems are the best solution. This system accomplishes the filling, aerating, settling and emptying operations in the same volume simultaneously following each other. This kind of operation is the basic difference with the continuous process system.

According to SBR (Sequencing Batch Reactor) method used in ARP units, the tank is designated as the aeration reactor during the blower operation time. In order to supply the necessary oxygen for the activated sludge process, a uniform air mixture is supplied via perforated air pipes or diffusers from the blower. Additionally a complete mixing is maintained and the settling of the bacterial flocs is prevented.

In the non-operating period of the blower, the tank becomes a sedimentation basin, where the bacterial flocs can settle at steady hydraulic conditions and form a sludge layer at the bottom. The treated water at the upper part of the tank is discharged by the integrated pump. The settled sludge is kept in the tank to maintain constant microorganism concentration. Excess sludge has to be removed periodically from the system to a sludge drying bed with air lift by blowers in order to maintain the amount of sludge at a certain value for achieving an efficient treatment. Disinfection of the treated water is achieved by means of chlorine dosing into the discharge pipe.

The energy consumption and the required area are similar to the continuous process package systems.

ILLUSTRATION OF ARP PLANT WITH SBR PROCESS



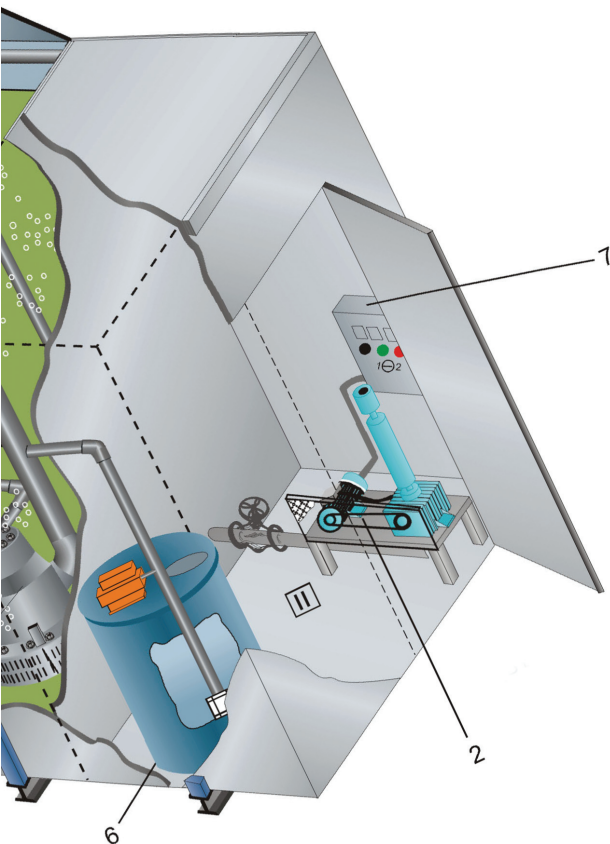
ARP PLANTS WITH CONTINUOUS REACTOR (CSR) PROCESS

The wastewater passing through the coarse screen goes to the aeration section by gravitational flow or a lifting pump. Activated sludge is produced in the aeration section by giving air to the wastewater. The air comes from the blower distributed uniformly by diffusers or perforated pipes. After optimized retention time in the aeration phase, a suitable piping transfers the wastewater to the lamella separator, which is designed especially against shock loads. The waste water leaves the suspended solids in the lamella separator and is transferred to the chlorination section and discharged to the receiving areas such as lake, river or sea. While most of the sludge separated from the wastewater is re-circulated to the aeration section with the air lift pump, the excess sludge is taken to the stabilization section to be aerated again in order to reduce the sludge amount.

DESIGN CRITERIA AND SELECTION TABLE

Model	Waste Water Inflow	Equivalent Population	Treatment Cap. (kg BOD/day)	Energy Consump. (kw/day)	Tank Dim. (WxHxL) (cm)	Number of Tank
50	10	50	3	32	240x288x200	1
100	20	100	6	57	240x288x300	1
200	40	200	12	64	240x288x600	1
300	60	300	18	87	240x288x800	1
400	80	400	24	92	240x288x1000	1
500	100	500	30	120	240x288x1200	1
600*	120	600	36	120	240x288x1400	1
700*	140	700	42	167	240x288x900	2
800*	160	800	48	185	240x288x1000	2
900*	180	900	54	221	240x288x1100	2
1000*	200	1000	60	228	240x288x1200	2

* The number of package unit can be changed up to the transportation type and where placed.



Blower



Control room



Lamella Settlers



Aeration Diffusers

Notes:

- Wastewater flow was calculated according to 200 lt/day.
- BOD₅ load for each person has been taken 60 gr/day.
- For over larger capacities parallel connected ARP units can be used. Please consult to our company.
- Given dimensions are informative, can be changed according to application.

The space requirements of ARP Plants are smaller than other systems as a result of the high microorganism concentration in the aeration section and the steady feeding of the system with a lifting pump. Geometrical shape of ARP unit is rectangular in international standard container dimensions for transportation purposes.

BENEFITS OF ARP PACKAGE SEWAGE TREATMENT PLANTS

- High efficiency with minimum energy consuming during the treatment,
- Working silent and no odor nuisance,
- Can be placed where requested,
- According to population, can be modified.
- Comparing with the other treatments, takes minimum area.

Technical Specifications;

- The package plant is manufactured and erected in our TÜV NORD ISO 9001 certificated factory.
- The units are manufactured appropriate for transportation in standard container sizes.
- Influent line and electrical connections are the only site works before start up.
- Standard layout of the plant is above surface level. If required, the plant can be placed underground with high quality isolation.
- The system can be easily adjusted for limited space. Due to modularity of the system, the capacity can be increased by additional units according to the population.
- The units are manufactured in mild steel. For protection against corrosion, all the surfaces are cleaned by sand blasting and painted with epoxy.
- The package plants are also being manufactured in Stainless Steel 304 or 316 according to customer requirements.
- The outlet water can either be discharged or reused for irrigation by adding automatic sand filtration unit.
- Operation and maintenance of the system is very easy and simple. There is no need for qualified personnel.

ASTİM Endüstri Tesisleri İmalat Montaj ve Taahhüt A.Ş.

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SOME OF OUR SELECTED REFERENCES FOR ARP UNITS

CUSTOMER: HAYRI MADENLI CONST. (TURKEY)

PROJECT PLACE: UKRAINE

COMPLATION DATE: 2006

TYPE: ARP – 500

CAPACITY: 500 P.E.

POLLUTION LOAD: 30 kg BOD/day





ARP PACKAGE TREATMENT PLANT REFERENCES

CUSTOMER: TAV TEPE AKFEN (TURKEY)

PROJECT PLACE: TUNISIA

COMPLATION DATE: 2007

TYPE: 2 X ARP – 500

CAPACITY: 1.000 P.E.

POLLUTION LOAD: 60 kg BOD/day



CUSTOMER: BATEMAN (SOUTH AFRICA)

PROJECT PLACE: BURKINA-FASO

COMPLATION DATE: 2007

TYPE: ARP – 500; ARP – 300

CAPACITY: 800 P.E.

POLLUTION LOAD: 48 kg BOD/day



CUSTOMER: *CYPRUS POOLS LTD. (CYPRUS)*

PROJECT PLACE: *CYPRUS*

COMPLATION DATE: *2008*

TYPE: *ARP – 600*

CAPACITY: *600 P.E.*

POLLUTION LOAD: *36 kg BOD/day*



CUSTOMER: *YASSONA SARL (MOROCCO)*

PROJECT PLACE: *MOROCCO*

COMPLATION DATE: *2009*

TYPE: *ARP – 150*

CAPACITY: *150 P.E.*

POLLUTION LOAD: *9 kg BOD/day*



CUSTOMER: YASSONA SARL (MOROCCO)

PROJECT PLACE: MOROCCO

COMPLATION DATE: 2009

TYPE: ARP – 150

CAPACITY: 150 P.E.

POLLUTION LOAD: 9 kg BOD/day



CUSTOMER: *BATEMAN (SOUTH AFRICA)*

PROJECT PLACE: *CANADA*

COMPLATION DATE: *2011*

TYPE: *ARP – 500 (CSR)*

CAPACITY: *500 P.E.*

POLLUTION LOAD: *30 kg BOD/day*



CUSTOMER: CAYELI COPPER MINING COMPANY (TURKEY)

PROJECT PLACE: TURKEY

COMPLATION DATE: 2012

TYPE: ARP – 500 (CSR)

CAPACITY: 500 P.E.

POLLUTION LOAD: 30 kg BOD/day



NO	CUSTOMER NAME	PLACE	CAPACITY [person]	POLLUTION LOAD [kg BOD / day]	COMPLETED DATE
1.	NORM ENGINEERING	MARMARİS	2x500	30	1988
2.	NUROL CONTRACTING INC. BAHÇEŞEHİR DWELLING	İSTANBUL	3000	90	1989
3.	NUROL CONTRACTING INC. BAHÇEŞEHİR DWELLING	CENTER/ İSTANBUL	200	6	1989
4.	MAS PUMP INDUSTRY INC.	SULTANÇİFTLİĞİ/ İSTANBUL	75	2.25	1991
5.	CYPRUS POOLS LTD. HOTEL PARK	CYPRUS	500	15	1991
6.	CYPRUS POOLS LTD. ACAPULCO HOLIDAY RESORT	CYPRUS	500	15	1991
7.	CYPRUS POOLS LTD. GARDENS HOLIDAY RESORT	CYPRUS	500	15	1991
8.	YÜKSEL İNŞ. A.Ş. HAPİMAG HOLIDAY RESORT	BODRUM	1500	45	1992
9.	BELEN OLUK PLATEU HOUSES COOPERATIVE	MERSİN	250	8	1992
10.	LEVİ'S DENİMKO INC.	ÇORLU	500	15	1992

NO	CUSTOMER NAME	PLACE	CAPACITY [person]	POLLUTION LOAD [kg BOD / day]	COMPLETED DATE
11.	TEKNOM LTD. MEB FOÇA HOLIDAY RESORT	İZMİR	500	15	1992
12.	GEMLİK PORT AND WAREHOUSE INC.	GEMLİK	300	9	1993
13.	İLKE İNŞ. LTD. GÜRPINAR HOLIDAY RESORT	İSTANBUL	500	15	1994
14.	BİM CONTRACTING ENGINEERING ARTHITECTURE TRADE LTD.	RUSSIA	200	6	1994
15.	CYPRUS POOLS LTD. SOS CHILDREN'S VILLAGE	CYPRUS	200	6	1994
16.	ER-KA TOURISM AND CONTRACTING INC.	EDİNCİK/ BANDIRMA	100	3	1994
17.	MNG HOLDING	ANTALYA	400	12	1994
18.	MARDAŞ INC.	AMBARLI/ İSTANBUL	200	6	1994
19.	BETA İNŞ. INC.	CYPRUS	300	9	1994
20.	PASİNER	ZONGULDAK	2 x 500	30	1995

NO	CUSTOMER NAME	PLACE	CAPACITY [person]	POLLUTION LOAD [kg BOD / day]	COMPLETED DATE
21.	DENİZATI CONTRACTING COOP.	BODRUM	2000	60	1995
22.	TEKNİKÖZGE CONTRACTING COOP.	İZMİR	200	6	1995
23.	S.O.S. INTERNATIONAL CHILDREN'S VILLAGE	DREN/ BULGARISTAN	200	6	1995
24.	DİNATEKS DİNAMİK TEXTILE	ÇORLU	500	15	1996
25.	CBC TEXTILE	BURSA	600	18	1996
26.	HOTEL PALMİRA	BODRUM	200	6	1997
27.	BEYSEL-1	KURŞUNLU/ BURSA	300	9	1997
28.	YAPI MERKEZİ A.Ş.	GEYVE	130	4	1997
29.	DEMİSAŞ A.Ş.	BİLECİK	500	30	1998
30.	KONDAŞ	GEBZE/ KOCAELİ	200	6	1998

NO	CUSTOMER NAME	PLACE	CAPACITY [person]	POLLUTION LOAD [kg BOD / day]	COMPLETED DATE
31.	SOLVENTAŞ INC.	GEBZE/ KOCAELİ	300	18	1998
32.	OSMANLI BANKASI HOLIDAY VİLLAGE	ALANYA	450	30	1998
33.	TEZCAN A.Ş.	ARSLANBEY/ KOCAELİ	150	4,5	1999
34.	KARYA HOLIDAY VILLAGE	TEKİRDAĞ	200	12	1999
35.	METİŞ A.Ş.	ANKARA	100	6	1999
36.	GAMA INC. TEAŞ KANGAL THERMIC ENERGY STATION	SİVAS	500	30	1999
37.	S.S. İSİTMA SOĞUTMA HAVALANDIRMA KÜÇÜK SANAYİ SİTESİ YAPI KOOP. KIR SİTESİ	HADIMKÖY/ İSTANBUL	500	30	1999
38.	AGE CONSTRUCTION & TRADE INC.	MARMARA EREĞLİSİ/ TEKİRDAĞ	150	9	1999
39.	AGE CONSTRUCTION & TRADE INC.	ESENBOĞA/ ANKARA	50	3	1999
40.	PLASKO PLASTİK INC.	LÜLEBURGAZ	150	8	2000

NO	CUSTOMER NAME	PLACE	CAPACITY [person]	POLLUTION LOAD [kg BOD / day]	COMPLETED DATE
41.	SUBOR GAP BORU FABRİKASI	ŞANLIURFA	150	9	2000
42.	ENKA – GAMA – TEKFEN – TOKAR JOINT VENTURE AFŞİN-ELBİSTAN THERMIC ENERGY STATION	AFŞİN-ELBİSTAN	3000	150	2000
43.	GAMA-TEKFEN JOINT VENTURE	İSKENDERUN	800	48	2000
44.	GAMA-TEKFEN JOINT VENTURE	İSKENDERUN	300	18	2001
45.	GAMA-TEKFEN JOINT VENTURE	İSKENDERUN	800	48	2001
46.	GEMPORT SEAPORT AND DEPOT ADM.	GEMLİK/ BURSA	600	36	2001
47.	GAMA-TEKFEN JOINT VENTURE	İSKENDERUN	800	48	2001
48.	ALKE CONSTRUCTION IND. LTD	İSTANBUL	100	6	2001
49.	GARANTI BALFOUR BEATTY	KOCAELI	150	9	2001
50.	ŞİŞECAM VLADİMİR GLASS FACTORY	VLADİMİR/ RUSIA	300	18	2002

NO	CUSTOMER NAME	PLACE	CAPACITY [person]	POLLUTION LOAD [kg BOD / day]	COMPLETED DATE
51.	ZINERJİ ENERGY INC.	BODRUM	200	12	2002
52.	IÇDAŞ STEEL ENERGY SHIPYARD AND TRANSPORTATION INC.	BİGA/ ÇANAKKALE	50	3	2002
53.	ŞİŞECAM JOINT STOCK COMPANY "MİNA" KSANI GLASS CONTAINER FACTORY	KSANI VILLAGE/ GÜRCİSTAN	200	12	2002
54.	TANRİVERDİ TEXTILE INDUSTRY	ÇATALCA/ İSTANBUL	200	12	2002
55.	FMV IŞIK ÜNİVERSİTESİ	ŞİLE/ İSTANBUL	500	30	2003
56.	PASİFİK CHEMICAL INDUSTRY	İSTANBUL	200	12	2004
57.	CATONİ PERSA	MERSİN	30	1 – 2	2004
58.	WORLD of WATER TECHNOLOGY	JORDAN	350	21	2004
59.	CRETE	CRETE ISLAND	200	12	2004
60.	FMV IŞIK ÜNİVERSİTESİ	ŞİLE/ İSTANBUL	500	30	2004

NO	CUSTOMER NAME	PLACE	CAPACITY [person]	POLLUTION LOAD [kg BOD / day]	COMPLETED DATE
61.	ENKA	RUSSIA	500	30	2004
62.	3D CONSTRUCTION ARAYMON FITTINGS FACTORY	-	30	1 2	2005
63.	WPSA DAHRAN PALACE HOTEL	SAUDI ARABIA	500	30	2005
64.	ÇAYELİ COPPER OPERATION INC.	RIZE/ TURKEY	20	1 2	2005
65.	WORLD of WATER TECHNOLOGY	JORDAN	200	12	2006
66.	ONURTAŞ CONSTRUCTION	BURSA/ TURKEY	500	30	2006
67.	BOĞAZLIYAN ŞEKER	YOZGAT/ TURKEY	500	30	2006
68.	HAYRI MADENLI CONSTRUCTION	UKRAINE	500	30	2006
69.	GEMPORT PORT and WAREHOUSING AD.CO.INC.	BALIKESIR/TURKEY	400	24	2007
70.	TAV TEPE AKFEN INC.	TUNUS	1.000	60	2007

NO	CUSTOMER NAME	PLACE	CAPACITY [person]	POLLUTION LOAD [kg BOD / day]	COMPLETED DATE
71.	TEZCAN GALVANIZ	TURKEY	300	18	2007
72.	BATEMAN	BURKINA FASO	800	48	2007
73.	CYPRUS POOLS LTD.	CYPRUS	600	36	2008
74.	MARZINC	-	150	9	2008
75.	WORLD of WATER TECHNOLOGY	JORDAN	700	42	2009
76.	YASASONA SARL	MOROCCO	150	9	2009
77.	AREEBEL CO.	AFGHANISTAN	800	24	2010
78.	BATEMAN	CANADA	500	30	2011