

SPECIFICATIONS

Function

VEMAR Sewage treatment plants work on the biological principles of Activated Sludge. In the Activated Sludge Reactor (DFA module) aerobic bacteria, present in the sewage itself, reduce the polluting organic matter in a process of digestion. Insufflated air accelerates this process and helps building bacterial colonies, commonly called "activated sludge".

Specific enzymatic reactions (oxidation) transform organic matter into simple organic molecules, which then become the nutriment for the entire biomass.

Project parameters adopted in a given plant will produce highest levels of stabilization and mineralization of the sludge. As a result, surplus sludge, and with this maintenance works, will be reduced to the minimum.

Description

Externals:

Vertical Activated Sludge Reactors (DFA) come as one-piece cylindrical modules in GRP with appropriately sized reinforcing rings to resist in underground installation.

Pedestrian safe covers correspond in size to the module diameters and can be fully removed for easy and secure access to the inside. Covers for modules from Ø 160 cm up come with two inspection lids (Ø 10 and 40 cm). All covers have slots for safe locking.

Internals, equipment and electrical devices

Oxidation Area:

Air pipes are in PVC (PN16), with descending pipes and fittings (1" and 1½") in stainless steel; all joints are threaded.

Descending air pipes can be dismantled from above easily to facilitate maintenance works.

Each descending air pipe has a valve to regulate and close the air flow.

Large diameter EPDM membrane air-diffusers are laser micro-perforated, long-lasting, self-cleaning and have a check valve.

All piping is appropriately anchored to the tank structure on GRP profiles.

Sedimentation Area:

The sedimentation area is an integrated part of the DFA. It has the build of a slide inclined 60° to the horizontal axis over part of module's length and allows a natural recirculation of the sludge.

Outlet collection from above the sedimentation area through downward borings Ø 5 cm in a PVC pipe Ø 10/12,5 cm.

The sewage level will be at a nominal 25 to 29 cm below ground level.

Blowers and Control Panel:

Low consumption blowers come with a manual timer, are silent and highly reliable.

Volumes of 10'000 and 12'000 liters feature CE and IP65 certified electric panels and come with Overload cutout devices, Solenoid starter, Manual timer and Stop/Run pilot lights.

Product quality:

All Vemar GRP products are made of ISO 9001:2000 guaranteed prime materials, mats and tissues of diversified basis weight.

All parts in GRP will undergo a post-polymerization process, i.e. are "baked" for 10 hours at 90°C.

This process, among other, guarantees long term reliability and is evidenced in a certificate issued by a SINAL accredited laboratory (www.sinal.it/eng), which proves the absence or non-traceability of monomer styrene.

Project parameters

Water consumption per user equivalent (AE)	250 liters / days
Coefficient for incoming sewage	80%
Organic charge per AE	60 gr BOD ₅ / day
Peak flow	q max = q. average x 3
Sludge concentration	3500 mg / liter
Charge factor of sludge	(0,2 kg BOD ₅ / kg SS aerated mass) x day
Oxygen load (Oc load)	2,2 kg O ₂ / kg BOD ₅
Average re-ascending speed in the sedimentation	< 0,3 m / h inT4 e < 0,35 m / h inT3

Table 3* Disposal into surface waters		Table 4* Disposal into the soil		nominal volume liters	Ø nominal cm	H total height cm	I max. width cm	E inlet height cm	U outlet height cm	Table 3 Blower W / V	Table 4 Blower kW / V	Ø pipe inlet outlet Ø cm
AE	model	AE	model									
5	DFA010ET3	4	DFA010ET4	1.000	100	141	112	20	25	39/220	39/220	10
7	DFA012ET3	6	DFA012ET4	1.200	100	173	112	20	25	53/220	39/220	10
10	DFA015FT3	7	DFA015FT4	1.500	120	143	130	21	26	64/220	53/220	10
13	DFA020FT3	10	DFA020FT4	2.000	120	193	130	21	26	86/220	64/220	10
16	DFA025GT3	-	-	2.500	160	142	174	21	26	130/220	-	10
20	DFA030GT3	14	DFA030GT4	3.000	160	161	174	21	26	130/220	86/220	10
24	DFA040GT3	18	DFA040GT4	4.000	160	208	174	21	26	221/220	141/220	10
28	DFA050HT3	22	DFA050HT4	5.000	200	160	217	23	28	221/220	130/220	10
34	DFA060HT3	26	DFA060HT4	6.000	200	205	217	23	28	221/220	221/220	12,5
-	-	30	DFA060IT4	6.000	230	186	250	24	29	-	221/220	12,5
45	DFA080IT3	-	-	8.000	230	234	250	24	29	280/220	-	12,5
-	-	40	DFA080LT4	8.000	243	204	263	24	29	-	280/220	12,5
50	DFA100LT3	-	-	10.000	243	247	263	24	29	320/220	-	12,5
58	DFA120LT3	47	DFA120LT4	12.000	243	290	263	24	29	320/220	280/220	12,5

* In accordance with EU legislation

Tank volumes from 8'000 to 12'000 liters have a rounded base.

AE = user equivalents

Remarks

DFA modules have no special equipment for sludge removal.

Install blower following instructions manual. In particular, protect blower from direct sun, rain and dust and see for a well aerated position. Always install Overload cutout device with blower. For underground installation carefully follow Vemar Instructions.

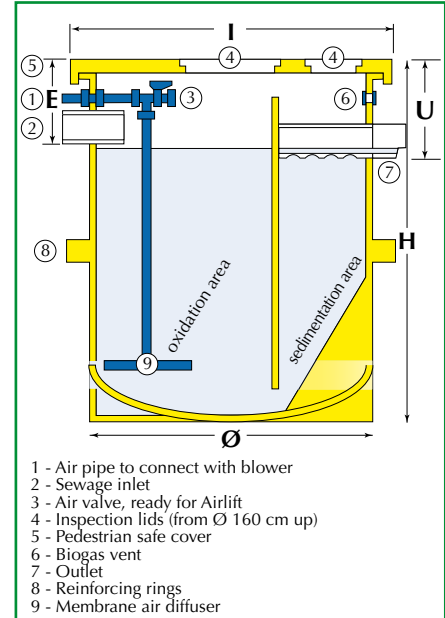
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Corporate quality system certified ISO 9001 : 2000.

Vemar reserves the right for changes without notice. All data, dimensions and particulars are indicative and may show common tolerances. All Vemar products are made for use under normal atmospheric pressure. Measurements include appliances.



DFA Activated Sludge Reactor, vertical



- 1 - Air pipe to connect with blower
- 2 - Sewage inlet
- 3 - Air valve, ready for Airlift
- 4 - Inspection lids (from Ø 160 cm up)
- 5 - Pedestrian safe cover
- 6 - Biogas vent
- 7 - Outlet
- 8 - Reinforcing rings
- 9 - Membrane air diffuser

Standard equipment includes a pedestrian safe cover

Incoming sewage

	Average concentration (mg/l)
BOD ₅ at 20°C	300
COD	500
Solids Total	700
Suspended Solids Total	380
Total N	40
Total P	10
Oil and grease	100

Table 3

Rest waters into surface waters (mg/l)
BOD ₅ < 40
COD < 160
Suspended Solids (SS) < 80

Table 4

Rest waters into the soil mg/l
BOD ₅ < 20
COD < 100
Suspended Solids (SS) < 25

VEMAR Plants can be outlet-free by means of an Evapotranspiration.

Drawings are not in scale

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VEMAR Sewage treatment plants work on the biological principles of Activated Sludge. In the Activated Sludge Reactor (DFA module) aerobic bacteria, present in the sewage itself, reduce the polluting organic matter in a process of digestion. Insufflated air accelerates this process and helps building bacterial colonies, commonly called "activated sludge".

Specific enzymatic reactions (oxidation) transform organic matter into simple organic molecules, which then become the nutriment for the entire biomass.

Project parameters adopted in a given plant will produce highest levels of stabilization and mineralization of the sludge. As a result, surplus sludge, and with this maintenance works, will be reduced to the minimum.

Description

Externals:

Vertical Activated Sludge Reactors (DFA) come as one-piece cylindrical modules in GRP with appropriately sized reinforcing rings to resist in underground installation. Conveniently dimensioned manholes (nominal Ø 80 cm, H 30 cm) give easy and secure access to the internals and have pedestrian safe covers with slots for safe locking.

Internals, equipment and electrical devices

Oxidation Area:

Air pipes are in PVC (PN16), with descending pipes and fittings (1" and 1½") in stainless steel; all joints are threaded.

Descending air pipes can be dismantled from above easily to facilitate maintenance works. Each descending air pipe has a valve to regulate and close the air flow.

Large diameter EPDM membrane air-diffusers are laser micro-perforated, long-lasting, self-cleaning and have a check valve.

All piping is appropriately anchored to the tank structure on GRP profiles.

Sedimentation Area:

The sedimentation area is an integrated part of the DFA. It has the build of a slide inclined 60° to the horizontal axis over part of the module's length and allows a natural recirculation of the sludge.

Outlet collection from above the sedimentation area through downward borings Ø 5 cm in a PVC pipe Ø 12,5 cm.

The sewage level will be at a nominal 57 cm below ground level.

Blowers and Control Panel:

Electric panels are certified CE and IP65 and come with Overload cutout devices, Solenoid starter, Manual timer and Stop/Run pilot lights.

Horizontal DFA modules are equipped with electric side channel blowers (IP44).

Product quality:

All Vemar GRP products are made of ISO 9001:2000 guaranteed prime materials, mats and tissues of diversified basis weight.

All parts in GRP will undergo a post-polymerization process, i.e. are "baked" for 10 hours at 90°C. This process, among other, guarantees long term reliability and is evidenced in a certificate issued by a SINAL accredited laboratory (www.sinal.it/eng), which proves the absence or non-traceability of monomer styrene.

Project parameters

Water consumption per user equivalent (AE)	250 liters / day
Coefficient for incoming sewage	80%
Organic charge per AE	60 gr BOD ₅ / day
Peak flow	q. max = q. average x3
Sludge concentration	3500 mg / liter
Charge factor of sludge	(0,2 kg BOD ₅ / kg SS aerated mass) x day
Oxygen load (Oc load)	2,2 kg O ₂ / kg BOD ₅
Average re-ascending speed in the sedimentation area	< 0,3 m / h in T4 and < 0,35 m / h in T3

Tabel 3* Disposal into surface waters		Table 4* Disposal into the soil		nominal volume liters	Ø nominal cm	I ø External cm	H total height cm	L length cm	E inlet height cm	U outlet height cm	Ø inlet out pipes cm	T3 Blower kW / V	T4 Blower kW / V	T3 n° man- holes	T4 n° man- holes
AE	model	AE	model												
65	DFA120HT3	55	DFA120HT4	12.000	200	222	244	411	58	69,5	12,5	0,55/220	0,32/220	2	2
90	DFA150HT3	75	DFA150HT4	15.000	200	222	244	498	58	69,5	12,5	0,55/220	0,55/380	2	2
110	DFA200T3	95	DFA200T4	20.000	230	252	274	520	58	72,5	12,5	1,1/380	1,1/380	2	2
145	DFA250T3	115	DFA250T4	25.000	230	252	274	640	58	72,5	12,5	1,1/380	1,1/380	2	2
185	DFA300T3	145	DFA300T4	30.000	230	252	274	760	58	72,5	12,5	1,5/380	1,1/380	3	2
220	DFA350T3	180	DFA350T4	35.000	230	252	274	882	58	72,5	12,5	1,5/380	1,5/380	3	4
250	DFA400T3	210	DFA400T4	40.000	230	252	274	1.002	58	72,5	12,5	1,5/380	1,5/380	4	4
305	DFA500T3	240	DFA500T4	50.000	243	265	287	1.116	58	71,5	12,5	3/380	1,5/380	5	3
380	DFA600T3	290	DFA600T4	60.000	243	265	287	1.332	58	71,5	12,5	3/380	1,5/380	5	4

* In accordance with EU legislation

Remarks

DFA modules have no special equipment for sludge removal.

Install blower following instructions manual.

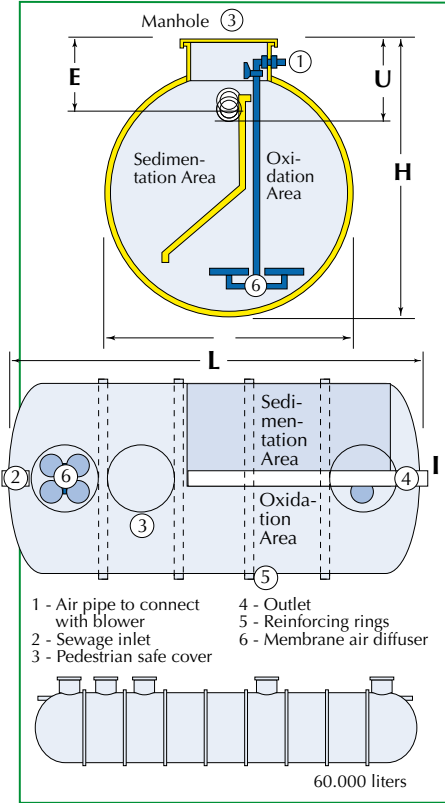
In particular, protect blower from direct sun, rain and dust and see for a well aerated position.

Always install Overload cutout device with blower.

For underground installation carefully follow Vemar Instructions.



DFA Activated Sludge Reactor, horizontal



Incoming sewage

	Average concentration (mg/l)
BOD ₅ at 20°C	300
COD	500
Solids Total	700
Suspended Solids Total	380
Total N	40
Total P	10
Oil and grease	100

AE = user equivalents

Table 3

Rest waters surface waters (mg/l)	
BOD ₅	< 40
COD	< 160
Suspended Solids (SS)	< 80

Table 4

Rest waters into the soil (mg/l)	
BOD ₅	< 20
COD	< 100
Suspended Solids (SS)	< 25

VEMAR Plants can be outlet-free by means of an Evapotranspiration.