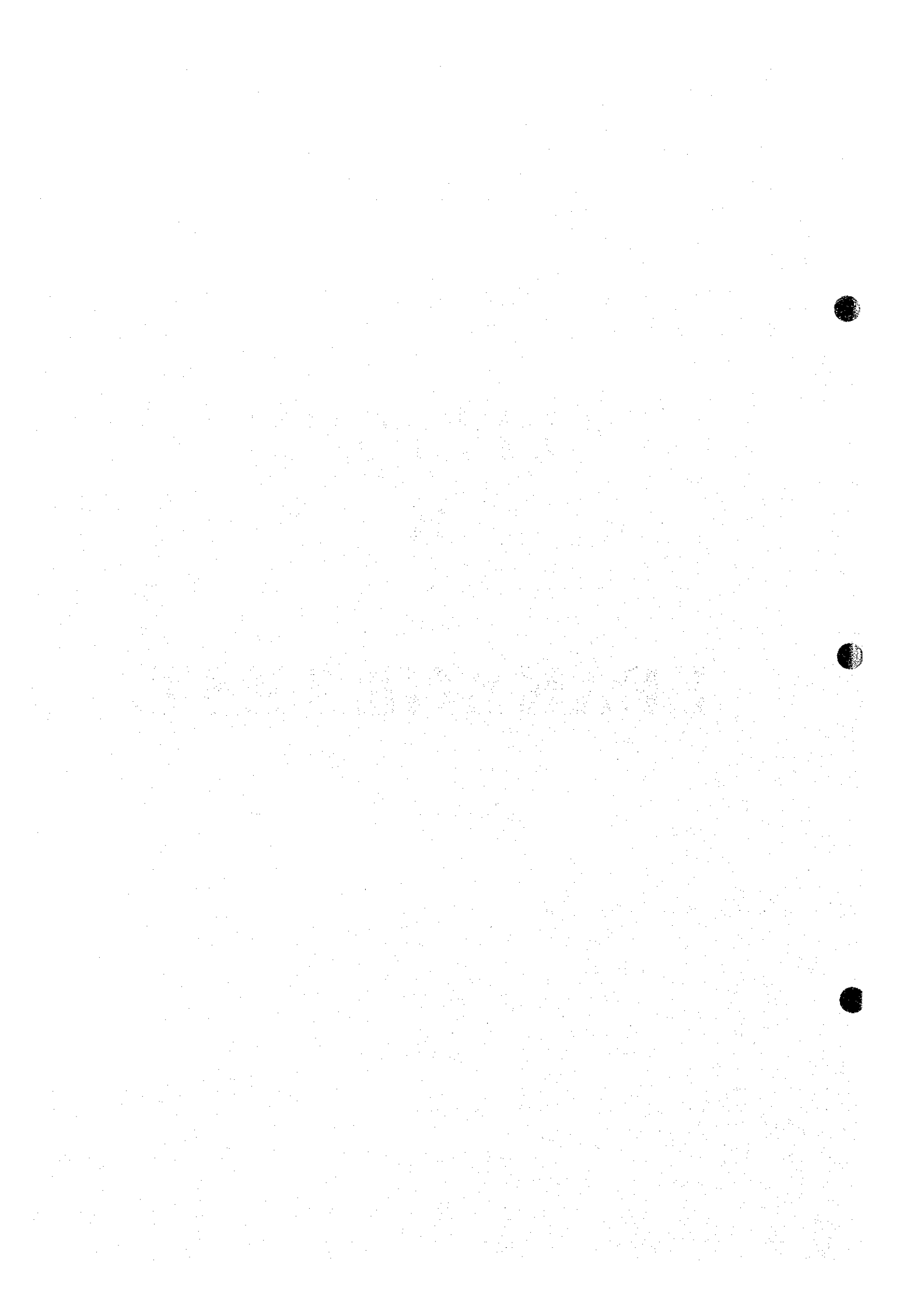


APPENDIX

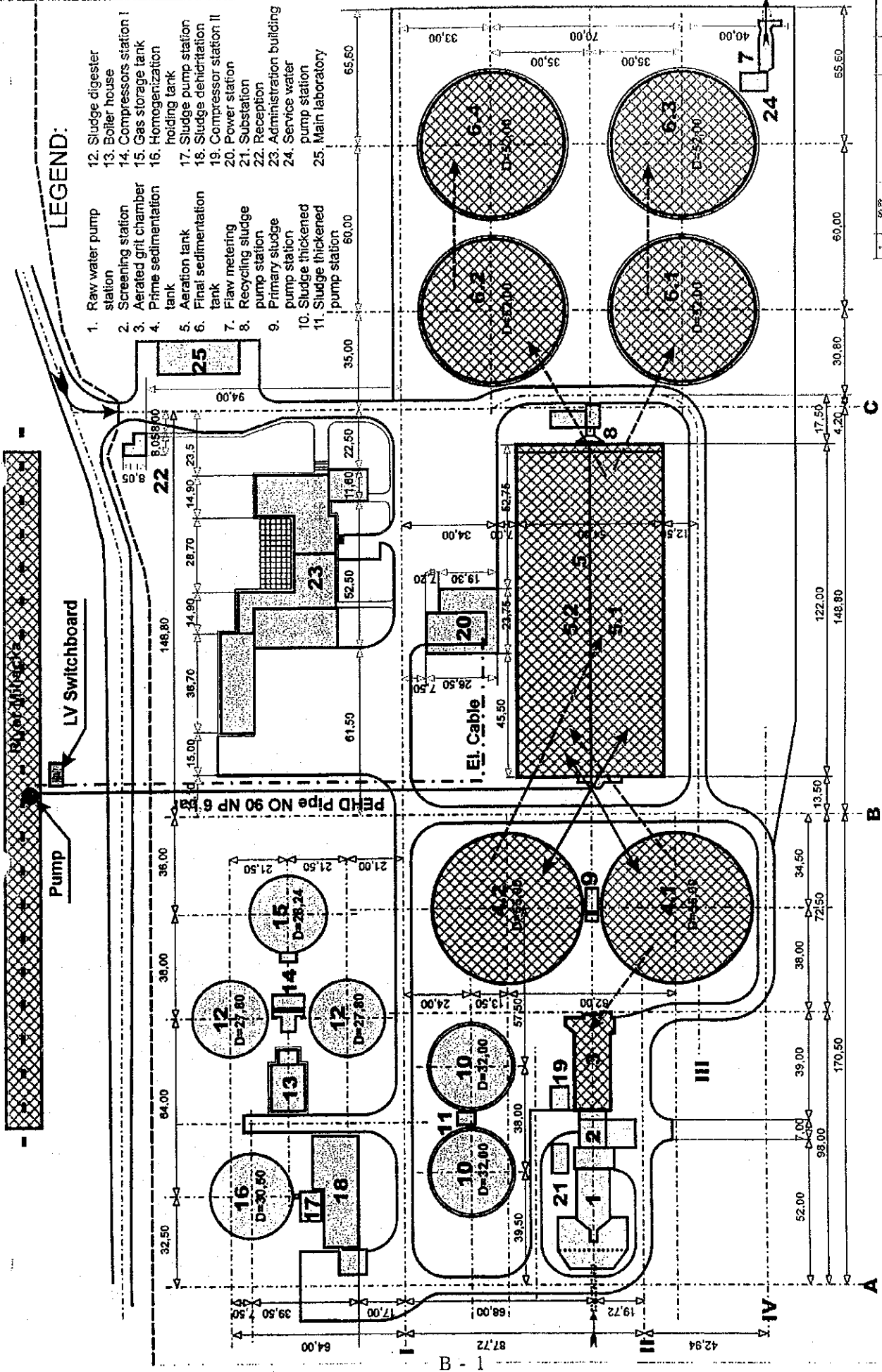
B

LEAKAGE TEST



LEGEND:

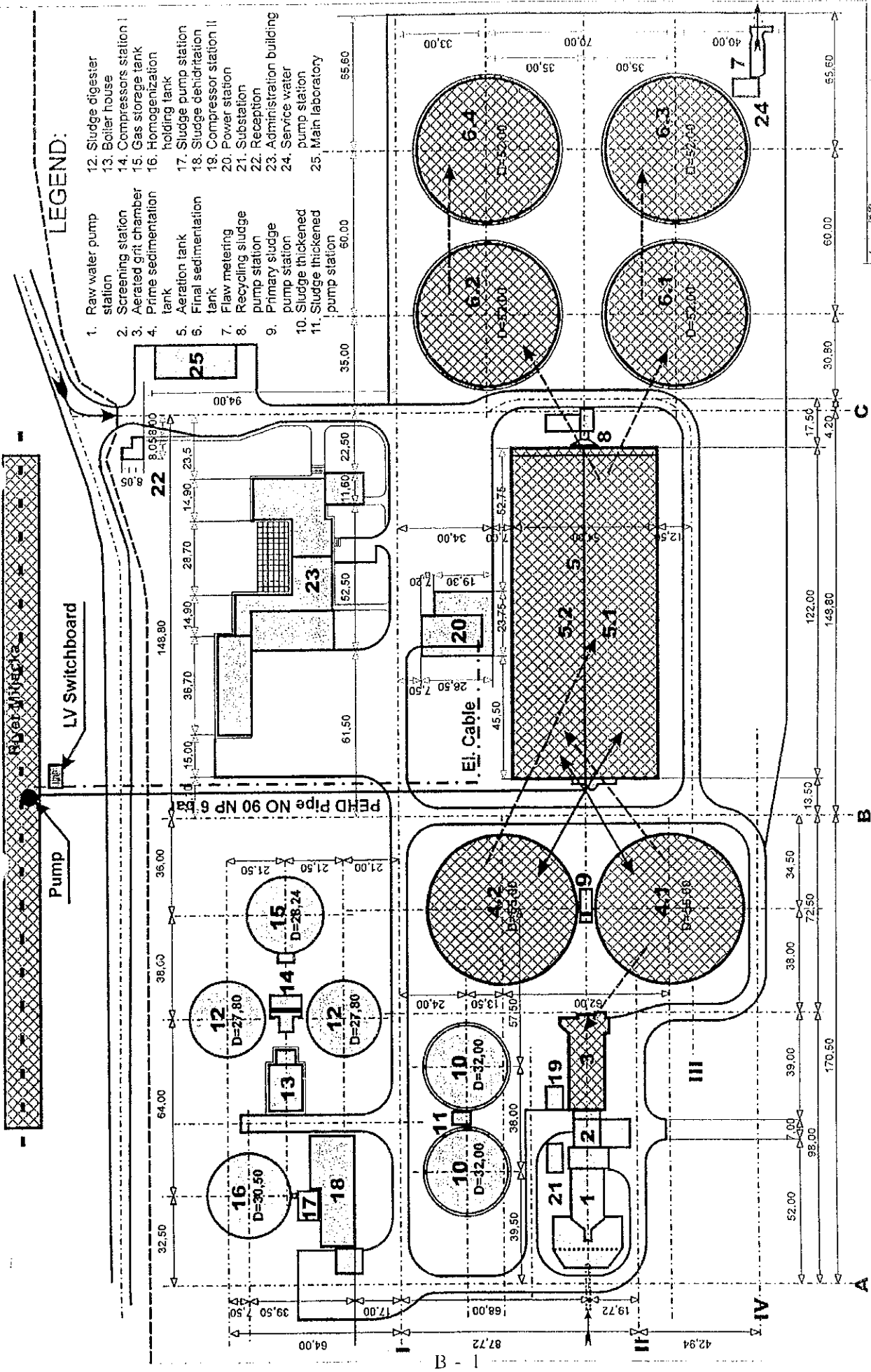
1. Raw water pump station
2. Screening station
3. Aerated grit chamber
4. Prime sedimentation tank
5. Aeration tank
6. Final sedimentation tank
7. Flaw metering pump station
8. Recycling sludge pump station
9. Primary sludge pump station
10. Sludge thickened pump station
11. Sludge thickened pump station
12. Sludge digester
13. Boiler house
14. Compressors station I
15. Gas storage tank
16. Homogenization holding tank
17. Sludge pump station
18. Sludge denitration
19. Compressor station II
20. Power station
21. Substation
22. Reception
23. Administration building
24. Service water pump station
25. Main laboratory



REV.	DATE	IZMIRNE	CRVAC	OCESBRD
THE WASTE WATER TREATMENT PLANT OF SARAJEVO CITY				
CLIENT : JICA STUDY TEAM				
SCHEME OF TANKS FILLING				
USE KEDLY				

LEGEND:

1. Raw water pump station
2. Screening station
3. Aerated grit chamber
4. Prime sedimentation tank
5. Aeration tank
6. Final sedimentation tank
7. Flow metering
8. Recycling sludge pump station
9. Primary sludge pump station
10. Sludge thickened pump station
11. Sludge thickened pump station
12. Sludge digester
13. Boiler house
14. Compressor station
15. Gas storage tank
16. Homogenization holding tank
17. Sludge pump station
18. Sludge dehydrator
19. Compressor station II
20. Power station
21. Substation
22. Reception
23. Administration building
24. Service water pump station
25. Main laboratory



REV.	DATE	BY	CHKD	STATUS	DESCRIPTION

THE WASTE WATER TREATMENT PLANT OF SARAJEVO CITY
 CLIENT: JICA STUDY TEAM

ISSUED BY: USB KEDLY
 5/14 3D 00 10/1/2004

SCHEME OF TANKS FILLING

HYDRAULIC TEST DRAIN TEST

INSPECTION SHEET

Object:

Tank N° 3 – Aerated grit chamber

Capacity:

1.200,00 m³

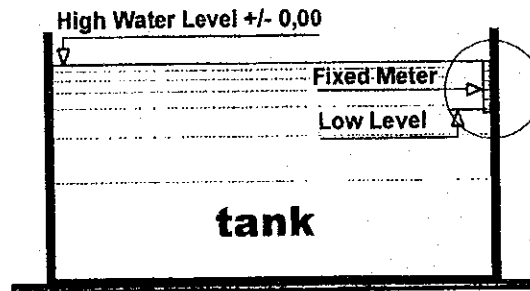
Construction form:

Square

Construction material:

Reinforced concrete

Measurement Scheme



N° of Measurement	Date of Measurement	Time (h)	Measurement level (mm)	Δh E-R (mm)	Daily Loss (mm) (4)-(5)	Daily Loss Allowable (mm) (7)	Leakage Factor "D" (6)/(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	25.06.99	0	0,00				
2	26.06.99	24	300,00	2,02	297,98	0,94	317,00
3	27.06.99	48	205,70	3,60	202,10	0,94	215,00
4	28.06.99	72	188,24	2,53	185,71	0,94	197,56
5	29.06.99	96	146,94	-5,68	152,62	0,94	162,36
Average Value:					209,60	0,94	222,98 > 1,00

*Note: For above data, see next pages

Test Result: Tank Hydraulic test drain test is fail. Adequate additional reparation and drain protection of inside surfaces of tank is recommended, including output pipes and valves.

Sarajevo 07.16.99

Tested by:


Ekrem Velagić B.Sc.

USB KEDLY

JICA STUDY TEAM

2. Tank 3. - Aerated grit chamber - Calculation of Daily Leakage from Tank

2.1. Calculation of Max. Allowable Daily Leakage from Tank, Dh max

Function $D_{hmax} = D_w : k = 3300 : 3500 = 0.94 \text{ mm per day}$

where:

a) D_w = Normal operating depth of tank = 3.300 mm

b) $k = 7 \text{ days} \times 500$ - Factor - 3500

2.2. Calculation of Daily Leakage from Tank

No of Meas.	Data of Measurement	Time of Measurement (h)	24h Correction Factor kt	Measurement Level (cm)	Δh_m mm	Δhmk (4)x(6) mm	Evaporation and Rain (E-R) (mm)	D-loss (7)-(8) (mm/day)	Dhmax (mm/day)	Factor-Lf (9)/(8)
(1.)	(2.)	(3.)	(4.)	(5.)	(6.)	(7.)	(8.)	(9.)	(10.)	(11.)
1	25.06.99	8h30m	1	90,0	300	300,00	0	0	0,94	317,00
2	26.06.99	8h30m	1	120,0	180	205,70	3,60	202,10	0,94	215,00
3	27.06.99	5h30m	1,1428	138,0	200	188,24	2,53	185,71	0,94	197,56
4	28.06.99	7h00m	0,941	158,0	150	146,94	-5,68	152,62	0,94	162,36
5	29.06.99	7h30m	0,9796	173,0				209,60	0,94	222,98
Average value-V:										

TEST CRITERIA:

Max. loss in 7 days no greater then 1/500 x Normal operating depth

Tank No 3. - Aerated grit chamber

No	Description	Unit	Date (D1)	E1 (mm)	Date (D2)	E2 (mm)	Date (D3)	E3 (mm)	Date (D4)	E4 (mm)
a	Water temperature (tw)	(C)	21,000	12,624	22,000	12,624	22,000	12,624	22,000	12,624
b	Max. vapor pressure (V)	(in.)	0,743	(1-1,32*0,01pa)	0,791	(1-1,32*0,01pa)	0,791	(1-1,32*0,01pa)	0,791	(1-1,32*0,01pa)
c	Air temperature (ta)	(C)	16,900	0,628	20,000	0,628	18,600	0,628	18,600	0,627
d	Relative humidity	(%)	62,100	(1+0,268w)	54,900	(1+0,268w)	65,900	(1+0,268w)	81,300	(1+0,268w)
e	Vapor pressure (v)	(in)	0,633	2,319	0,590	2,260	0,672	2,678	0,790	2,498
f	Wind velocity (w)	(mph)	4,92	(V-v)	4,70	(V-v)	6,26	(V-v)	5,59	(V-v)
g	Barometric pressure (pa)	(in)	28,196	0,11	28,163	0,201	28,196	0,119	28,249	0,001
		E (mm)	06.26.99	2,02	06.27.99	3,60	06.28.99	2,53	06.29.99	0,02
		R (mm)		0,00		0,00		0,00		5,70
		E-R (mm)		2,02		3,60		2,53		-5,68

HYDRAULIC TEST DRAIN TEST

INSPECTION SHEET

Object:

Tank N° 4.1 – Primary Sedimentation Tank

Capacity:

7.150,00 m³

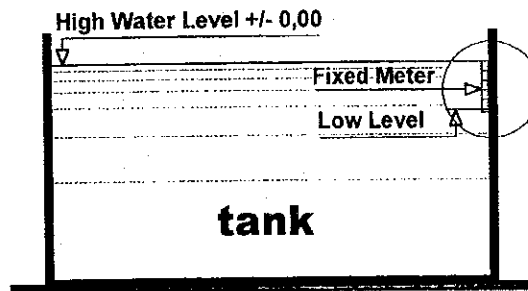
Construction form:

Round; D = 55,00 m; Hm = 3,01 m; 2375 m²

Construcion material:

Reinforced concrete

Measurement Scheme



N° of Measurement	Date of Measurement	Time (h)	Measurement level (mm)	Δh E-R (mm)	Daily Loss (mm) (4)-(5)	Daily Loss Allowable (mm) (7)	Leakage Factor "D" (6)/(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	18.06.99	0	0,00			0,86	
2	19.06.99	24	50,27	-8,23	58,50	0,86	68,02
3	20.06.99	48	43,08	2,36	40,72	0,86	47,35
4	21.06.99	72	58,00	0,45	57,55	0,86	66,92
5	22.06.99	96	25,53	-15,69	41,22	0,86	47,92
Average Value:					49,50	0,86	57,55 > 1,00

*Note: For above dada, see next pages

Test Result: Tank Hydraulic test drain test is fail. Adecvate additional reparation and drain protection of inside surfaces of tank is recommended, including output pipes and valves.

Sarajevo 07.16.99

Tested by:


Ekrem Velagić B.Sc.

1.2.2. Tank No 4.1

No of Meas.	Data of Measurement	Time of Measurement (h)	24h Correction Factor kt	Measurement Level (cm)	Δhm mm	Δhmk (4)x(6) mm	Evaporation and Rain (E-R) (mm)	D-loss (7)-(8) (mm/day)	Dhmax (mm/day)	Factor-Lf (9)/(8)
(1.)	(2.)	(3.)	(4.)	(5.)	(6.)	(7.)	(8.)	(9.)	(10.)	(11.)
1	18.06.99	9h35m	1	91,5			0	0		
2	19.06.99	11h50m	0,914	86,0	55	50,27	-8,23	58,50	0,86	68,02
3	20.06.99	9h30m	1,077	82,0	40	43,08	2,36	40,72	0,86	47,35
4	21.06.99	9h30m	1,000	76,2	58	58,00	0,45	57,55	0,86	66,92
5	22.06.99	9h00m	1,021	73,7	25	25,53	-15,69	41,22	0,86	47,92
Average value-V:								49,50	0,86	57,55

B : 6

TEST CRITERIA:

Max. loss in 7 days no greater than 1/500 x Normal operating depth

Tank No 4.1. - Primary Sedimentation Tank

No	Description	Unit	Date (D1)	E1 (mm)	Date (D2)	E2 (mm)	Date (D3)	E3 (mm)	Date (D4)	E4 (mm)
a	Water temperature (tw)	(C)	23,000	12,624	23,000	12,624	22,000	12,624	21,000	12,624
b	Max. vapor pressure (V)	(in.)	0,840	(1-1,32*0,01pa)	0,840	(1-1,32*0,01pa)	0,791	(1-1,32*0,01pa)	0,743	(1-1,32*0,01pa)
c	Air temperature (ta)	(C)	17,700	0,628	18,200	0,628	19,900	0,632	8,200	0,631
d	Relative humidity	(%)	50,700	(1+0,268w)	70,700	(1+0,268w)	59,500	(1+0,268w)	89,800	(1+0,268w)
e	Vapor pressure (v)	(in)	0,617	2,018	0,721	2,498	0,607	2,080	0,716	2,857
f	Wind velocity (w)	(mph)	3,80	(V-v)	5,59	(V-v)	4,03	(V-v)	6,93	(V-v)
g	Barometric pressure (pa)	(in)	28,208	0,223	28,148	0,119	27,906	0,184	27,927	0,027
		E (mm)	06.19.99	3,57	06.20.99	2,36	06.21.99	3,05	06.22.99	0,61
		R (mm)		11,80		0,00		2,60		16,30
		E-R (mm)		-8,23		2,36		0,45		-15,69

HYDRAULIC TEST DRAIN TEST

INSPECTION SHEET

Object:

Tank N° 4,2 – Primary Sedimentation Tank

Capacity:

7.150,00 m³

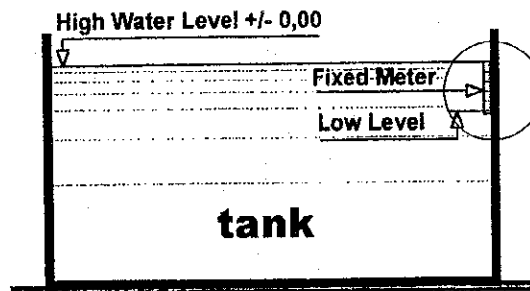
Construction form:

Round; D = 55,00 m; Hm = 3,01 m; 2375 m²

Construction material:

Reinforced concrete

Measurement Scheme



N° of Measurement	Date of Measurement	Time (h)	Measurement level (mm)	Δh E-R (mm)	Daily Loss (mm) (4)-(5)	Daily Loss Allowable (mm)	Leakage Factor (6)/(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	13.06.99	0	0,00			0,86	
2	14.06.99	24	26,60	-3,12	29,18	0,86	33,93
3	15.06.99	48	30,00	0,53	29,47	0,86	34,27
4	16.06.99	72	25,28	2,27	27,55	0,86	32,03
5	17.06.99	96	21,12	-8,39	29,51	0,86	34,31
Average Value:						0,86	33,64 > 1,00

*Note: For above data, see next pages

Test Result: Tank Hydraulic test drain test is fail. Adequate additional reparation and drain protection of inside surfaces of tank is recommended, including output pipes and valves.

Sarajevo 07.16.99

Tested by:


 Ekrem Velagić B.Sc.

1. Primary Sedimentation Tanks - Calculation of Daily Leakage from Tanks

1.1. Calculation of Max. Allowable Daily Leakage from Tank, Dh max

Function $Dh_{max} = (T_c / T_a) \cdot k = 3010 : 3500 = 0.86 \text{ mm per day}$

where:

- a) $T_c = 7150,00 \text{ m}^3$ - Total capacity of tank
- b) $T_a = D \times D \times 3,14 / 4$ - Surface of the tank - 2375 m^2
- c) $T_c / T_a = 7150 / 2375 \text{ m}$ - average depth of the tank - 3,01 m
- d) $k = 7 \text{ days} \times 500$ - Factor - 3500

1.2. Calculation of Daily Leakage from Tanks

1.2.1. Tank No 4.2

No of Meas.	Data of Measurement	Time of Measurement (h)	24h Correction Factor kt	Measurement Level (cm)	Δh_m mm	$\Delta h_{mk} (4) \times (6)$ mm	Evaporation and Rain (E-R) (mm)	D-loss (7)-(8) (mm/day)	Dhmax (mm/day)	Factor-Lf (9)/(8)
(1.)	(2.)	(3.)	(4.)	(5.)	(6.)	(7.)	(8.)	(9.)	(10.)	(11.)
1	13.06.99	11h05m	1	32,8			0	0		
2	14.06.99	9h00m	1,086	35,2	24	26,06	-3,12	29,18	0,86	33,93
3	15.06.99	9h00m	1	38,2	30	30,00	0,53	29,47	0,86	34,27
4	16.06.99	8h45m	1,011	40,7	25	25,28	-2,27	27,55	0,86	32,03
5	17.06.99	9h45m	0,96	42,9	22	21,12	-8,39	29,51	0,86	34,31
Average value-V:								28,93	0,86	33,64

TEST CRITERIA:

Max. loss in 7 days no greater then 1/500 x Normal operating depth

1. Calculation of Daily Evaporation from Tank Water Surface

Function

$$E = 12,624(1-1.32*0.01pa)(1+0.268w)(V-v) \text{ mm/day}$$

Tank No 4.2. - Primary Sedimentation Tank

No	Description	Unit	Date (D1)	E1 (mm)	Date (D2)	E2 (mm)	Date (D3)	E3 (mm)	Date (D4)	E4 (mm)
a	Water temperature (tw)	(C)	21,500	12,624	22,000	12,624	22,000	12,624	22,000	12,624
b	Max. vapor pressure (V)	(in.)	0,767	(1-1,32*0,01pa)	0,791	(1-1,32*0,01pa)	0,791	(1-1,32*0,01pa)	0,791	(1-1,32*0,01pa)
c	Air temperature (ta)	(C)	20,500	0,628	20,100	0,627	17,200	0,627	15,600	0,628
d	Relative humidity	(%)	65,800	(1+0,268w)	67,300	(1+0,268w)	79,500	(1+0,268w)	89,700	(1+0,268w)
e	Vapor pressure (v)	(in)	0,671	2,077	0,686	2,206	0,789	2,206	0,79	1,659
f	Wind velocity (w)	(mph)	4,02	(V-v)	4,50	(V-v)	4,50	(V-v)	2,46	(V-v)
g	Barometric pressure (pa)	(in)	28,211	0,096	28,256	0,105	28,260	0,002	28,163	0,001
			06.14.99	1,58	06.15.99	1,83	06.16.99	0,03	06.17.99	0,01
E (mm)				4,70		1,30		2,30		8,40
R (mm)				-3,12		0,53		-2,27		-8,39
E-R (mm)										

HYDRAULIC TEST DRAIN TEST

INSPECTION SHEET

Object:

Tank N° 5.1 – Aeration Tank

Capacity:

12.000,00 m³

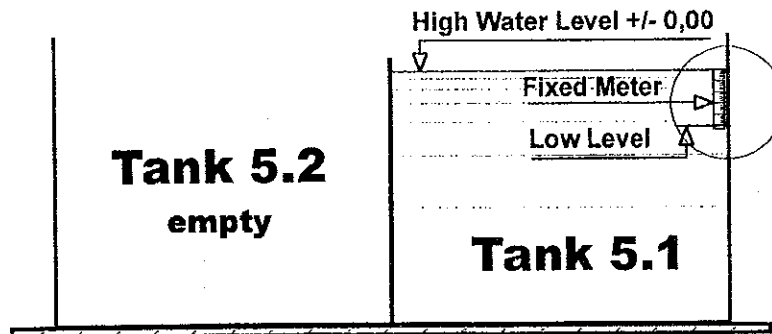
Construction form:

Square

Construction material:

Reinforced concrete

Measurement Scheme



N° of Measurement	Date of Measurement	Time (h)	Measurement level (mm)	Δh E-R (mm)	Daily Loss (mm) (4)-(5)	Daily Loss Allowable (mm) (7)	Leakage Factor "D" (6)/(7) (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	25.06.99	0	0,00				
2	26.06.99	24	258,30	2,46	255,84	1,04	246,00
3	27.06.99	48	219,03	4,14	214,89	1,04	206,63
4	28.06.99	72	184,60	2,53	182,07	1,04	175,07
Average Value:					217,60	1,04	209,23 > 1,00

*Note: For above data, see next pages

Test Result: Tank Hydraulic test drain test is fail. Adecvate additional reparation and drain protection of inside surfaces of tank is recommended, including output pipes and valves.

Sarajevo 07.16.99

Tested by:


Ekrem Velagić B.Sc.

3 Aeration Tanks - Calculation of Daily Leakage from Tanks

3.1. Calculation of Max. Allowable Daily Leakage from Tank, Dh max

Function $Dh_{max} = Dw : k = 3650 : 3500 = 1,04 \text{ mm per day}$

where:

- a) Dw = Normal operating depth of tank = 3.650 mm
- b) k = 7days x 500 - Factor - 3500

3.2. Tank No 5.1 - Calculation of Daily Leakage from Tank

No of Meas.	Data of Measurement (2.)	Time of Measurement (h) (3.)	24h Correction Factor kt (4.)	Measurement Level (cm) (5.)	Δhm mm (6.)	Δhmk (4)x(6) mm (7.)	Evaporation and Rain (E-R) (mm) (8.)	D-loss (7)-(8) (mm/day) (9.)	Dhmax (mm/day) (10.)	Factor-Lf (9)/(8) (11.)
1	25.06.99	13h00m	1	200,0	210	258,30	0	0	1,04	246,00
2	26.06.99	8h30m	1,23	179,0	210	219,03	2,46	255,84	1,04	206,63
3	27.06.99	7h30m	1,043	158,0	200	184,60	4,14	214,89	1,04	175,07
4	28.06.99	9h30m	0,923	138,0			2,53	182,07	1,04	175,07
Average value-V:									1,04	209,23

B - 12

TEST CRITERIA:

Max. loss in 7 days no greater then 1/500 x Normal operating depth

Tank No 5.1. - Aeration Tank

No	Description	Unit	Date (D1)	E1 (mm)	Date (D2)	E2 (mm)	Date (D3)	E3 (mm)
a	Water temperature (tw)	(C)	21,500	12,624	22,000	12,624	22,000	12,624
b	Max. vapor pressure (V)	(in.)	0,767	(1-1,32*0,01 pa)	0,791	(1-1,32*0,01 pa)	0,791	(1-1,32*0,01 pa)
c	Air temperature (ta)	(C)	16,900	0,628	20,000	0,628	18,600	0,628
d	Relative humidity	(%)	62,100	(1+0,268w)	54,900	(1+0,268w)	65,900	(1+0,268w)
e	Vapor pressure (v)	(in)	0,633	2,319	0,560	2,260	0,672	2,678
f	Wind velocity (w)	(mph)	4,92	(V-v)	4,70	(V-v)	6,26	(V-v)
g	Barometric pressure (pa)	(in)	28,196	0,134	28,163	0,231	28,196	0,119
E (mm)			06.26.99	2,46	06.27.99	4,14	06.28.99	2,53
R (mm)				4,70		1,30		2,30
E-R (mm)				-2,24		2,84		0,23

HYDRAULIC TEST DRAIN TEST

INSPECTION SHEET

Object:

Tank N° 5.2- Aeration Tank

Capacity:

12.000,00 m³

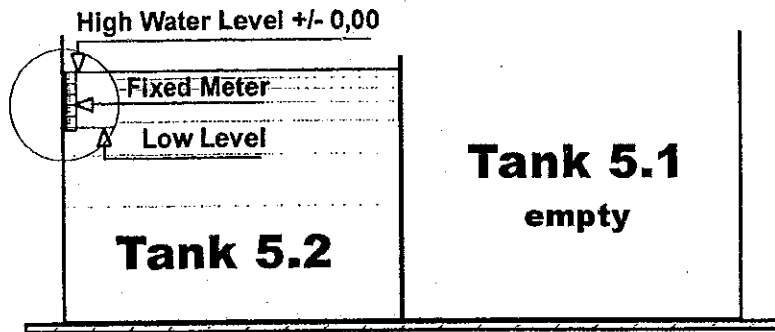
Construction form:

Square

Construction material:

Reinforced concrete

Measurement Scheme



N° of Measurement	Date of Measurement	Time (h)	Measurement level (mm)	Δh E-R (mm)	Daily Loss (mm) (4)-(5)	Daily Loss Allowable (mm) (7)	Leakage Factor "D" (6)/(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	10.07.99	0	0,00				
2	11.07.99	24	8,27	-2,68	10,95	1,04	10,53
3	12.07.99	48	12,63	1,44	11,19	1,04	10,76
Average Value:					11,07	1,04	10,64 > 1,00

*Note: For above data, see next pages

Test Result: Tank Hydraulic test drain test is fail. Adequate additional reparation and drain protection of inside surfaces of tank is recommended, including output pipes and valves.

Sarajevo 07.16.99

Tested by:


Ekrem Velagić B.Sc.

3.4. Tank No 5.2 - Calculation of Daily Leakage from Tank

No of Meas.	Data of Measurement	Time of Measurement (h)	24h Correction Factor kt	Measurement Level (cm)	Δh_m mm	Δh_{mk} (4)x(5) mm	Evaporation and Rain (E-R) (mm)	D-loss (7)-(8) (mm/day)	Dhmax (mm/day)	Factor-Lf (9)/(8)
(1.)	(2.)	(3.)	(4.)	(5.)	(6.)	(7.)	(8.)	(9.)	(10.)	(11.)
1	10.07.99	7h00m	1	161,0			0	0		
2	11.07.99	13h00m	0,827	162,0	10	8,27	-2,68	10,95	1,04	10,53
3	12.07.99	8h00m	1,263	163,0	10	12,63	1,44	11,19	1,04	10,76
Average value-V:								11,07	1,04	10,64

TEST CRITERIA:

Max. loss in 7 days no greater then 1/500 x Normal operating depth

Tank No 5.2. - Aeration Tank

No	Description	Unit	Date (D1)	E1 (mm)	Date (D2)	E2 (mm)	Date (D3)	E3 (mm)
a	Water temperature (tw)	(C)	22,000	12,624	22,500	12,624	22,500	12,624
b	Max. vapor pressure (V)	(in.)	0,791	(1-1,32*0,01pa)	0,815	(1-1,32*0,01pa)	0,815	(1-1,32*0,01pa)
c	Air temperature (ta)	(C)	16,600	0,629	19,900	0,628	21,800	0,628
d	Relative humidity	(%)	81,600	(1+0,268w)	73,000	(1+0,268w)	68,100	(1+0,268w)
e	Vapor pressure (v)	(in)	0,789	2,018	0,745	2,260	0,695	1,898
f	Wind velocity (w)	(mph)	3,80	(V-v)	4,70	(V-v)	3,35	(V-v)
g	Barometric pressure (pa)	(in)	28,115	0,002	28,172	0,07	28,151	0,12
			07.10.99	0,03	07.11.99	1,25	07.12.99	1,81
E (mm)				4,70		1,30		2,30
R (mm)				-4,67		-0,05		-0,49
E-R (mm)								

HYDRAULIC TEST DRAIN TEST

INSPECTION SHEET

Object:

Tank N° 5.1 + 5.2- Aeration Tank

Capacity:

24.000,00 m³

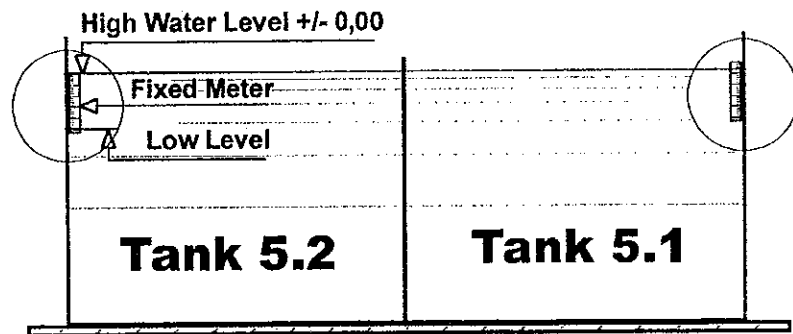
Construction form:

Square

Construction material:

Reinforced concrete

Measurement Scheme



N° of Measurement	Date of Measurement	Time (h)	Measurement level (mm)	Δh E-R (mm)	Daily Loss (mm) (4)-(5)	Daily Loss Allowable (mm) (7)	Leakage Factor "D" (6)/(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	06.07.99	0	0,00				
2	07.07.99	24	35,00	1,82	33,18	1,04	31,90
3	08.07.99	48	27,69	0,52	27,17	1,04	26,13
Average Value:					30,18	1,04	29,01 > 1,00

*Note: For above data, see next pages

Test Result: Tank Hydraulic test drain test is fail. Adequate additional reparation and drain protection of inside surfaces of tank is recommended, including output pipes and valves.

Sarajevo 07.16.99

Tested by:


Ekrem Velagić B.Sc.

3.3. Tank No 5.1+5.2 - Calculation of Daily Leakage from Tank

No of Meas.	Data of Measurement	Time of Measurement (h)	24h Correction Factor Kt	Measurement Level (cm)	Δh_m mm	Δh_{mk} (4)x(6) mm	Evaporation and Rain (E-R) (mm)	D-loss (7)-(8) (mm/day)	Dhmax (mm/day)	Factor-Lf (9)/(8)
(1.)	(2.)	(3.)	(4.)	(5.)	(6.)	(7.)	(8.)	(9.)	(10.)	(11.)
1	06.07.99	13h00m	1	178,5			0	0		
2	07.07.99	13h00m	1	175,0	35	35,00	1,82	33,18	1,04	31,90
3	08.07.99	15h00m	0,923	172,0	30	27,69	0,52	27,17	1,04	26,13
Average value-V:								30,18	1,04	29,01

TEST CRITERIA:

Max. loss in 7 days no greater than 1/500 x Normal operating depth

Tank No 5.1.+ 5.2 - Aeration Tank

No	Description	Unit	Date (D1) 07.06.99	E1 (mm)	Date (D2) 07.07.99	E2 (mm)	Date (D3) 07.08.99	E3 (mm)
a	Water temperature (tw)	(C)	22,000	12,624	22,000	12,624	23,000	12,624
b	Max. vapor pressure (V)	(in.)	0,719	(1-1,32*0,01pa)	0,719	(1-1,32*0,01pa)	0,840	(1-1,32*0,01pa)
c	Air temperature (ta)	(C)	24,900	0,628	22,100	0,628	17,800	0,627
d	Relative humidity	(%)	57,100	(1+0,268w)	65,100	(1+0,268w)	87,400	(1+0,268w)
e	Vapor pressure (v)	(in)	0,582	2,319	0,627	2,498	0,801	1,643
f	Wind velocity (w)	(mph)	4,92	(V-v)	5,59	(V-v)	2,40	(V-v)
g	Barometric pressure (pa)	(in)	28,190	0,137	28,163	0,092	28,228	0,039
			07.06.99	2,52	07.07.99	1,82	07.08.99	0,51
E (mm)				0,00		0,00		0,00
R (mm)				2,52		1,82		0,51
E-R (mm)								

HYDRAULIC TEST DRAIN TEST

INSPECTION SHEET

Object:

Tank N° 6.1 – Final Sedimentation Tank

Capacity:

7.400,00 m³

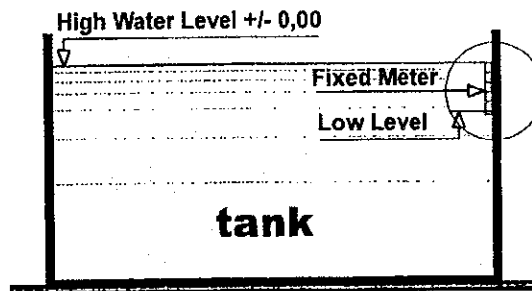
Construction form:

Round; D = 52,00 m; Hm = 3,48 m;

Construction material:

Reinforced concrete

Measurement Scheme




N° of Measurement	Date of Measurement	Time (h)	Measurement level (mm)	Δh E-R (mm)	Daily Loss (mm) (4)-(5)	Daily Loss Allowable (mm) (7)	Leakage Factor "D" (6)/(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	13.07.99	0	0,00				
2	14.07.99	24	8,02	2,58	5,44	0,88	6,18
3	15.07.99	48	7,91	1,51	6,40	0,88	7,28
4	16.07.99	72	10,10	4,13	5,97	0,88	6,78
Average Value:					5,94	0,88	6,75 > 1,00

*Note: For above data, see next pages

Test Result: Tank Hydraulic test drain test is fail. Adequate additional reparation and drain protection of inside surfaces of tank is recommended, including output pipes and valves.

Sarajevo 07.16.99

Tested by:



Ekrem Velagić B.Sc.

4 Final Sedimentation Tanks - Calculation of Daily Leakage from Tanks

4.1. Calculation of Max. Allowable Daily Leakage from Tank, Dh max

Function $Dh_{max} = Dw : k = 3100 : 3500 = 0,88 \text{ mm per day}$

where:

a) Dw = Normal operating depth of tank = 3.100 mm

b) k = 7days x 500 - Factor - 3500

4.2. Tank No 6.1 - Calculation of Daily Leakage from Tank

No of Meas.	Data of Measurement	Time of Measurement (h)	24h Correction Factor kt	Measurement Level (cm)	Δh_m mm	Δh_{mk} (4)x(6) mm	Evaporation and Rain (E-R) (mm)	D-loss (7)-(8) (mm/day)	Dhmax (mm/day)	Factor-Lf (9)/(8)
(1.)	(2.)	(3.)	(4.)	(5.)	(6.)	(7.)	(8.)	(9.)	(10.)	(11.)
1	13.07.99	16h00m	1	175,0			0	0		
2	14.07.99	9h30m	0,729	173,9	11	8,02	2,58	5,44	0,88	6,18
3	15.07.99	9h15m	0,989	173,1	8	7,91	1,51	6,40	0,88	7,28
4	16.07.99	9h30m	1,010	172,1	10	10,10	4,13	5,97	0,88	6,78
Average value-V:									0,88	6,75

TEST CRITERIA:

Max. loss in 7 days no greater than 1/500 x Normal operating depth

Tank No 6.1. - Final Sedimentation Tank

No	Description	Unit	Date (D1)	E1 (mm)	Date (D2)	E2 (mm)	Date (D3)	E3 (mm)	Date (D4)	E4 (mm)
a	Water temperature (tw)	(C)	23,000	12,624	23,500	12,624	23,500	12,624	23,500	12,624
b	Max. vapor pressure (V)	(in.)	0,840	(1-1,32*0,01pa)	0,866	(1-1,32*0,01pa)	0,866	(1-1,32*0,01pa)	0,866	(1-1,32*0,01pa)
c	Air temperature (ta)	(C)	22,100	0,629	20,600	0,631	18,900	0,629	17,700	0,628
d	Relative humidity	(%)	65,000	(1+0,268w)	71,600	(1+0,268w)	62,400	(1+0,268w)	61,700	(1+0,268w)
e	Vapor pressure (v)	(in)	0,663	1,839	0,73	2,378	0,636	2,198	0,639	2,294
f	Wind velocity (w)	(mph)	3,13	(V-v)	5,14	(V-v)	4,47	(V-v)	4,83	(V-v)
g	Barometric pressure (pa)	(in)	28,088	0,177	27,960	0,136	28,124	0,23	28,216	0,227
			07.13.99	2,59	07.14.99	2,58	07.15.99	4,01	07.16.99	4,13
E (mm)				0,00		0,00		2,50		0,00
R (mm)				2,59		2,58		1,51		4,13
E-R (mm)										

HYDRAULIC TEST DRAIN TEST

INSPECTION SHEET

Object:

Tank N° 6.2 – Final Sedimentation Tank

Capacity:

7.400,00 m³

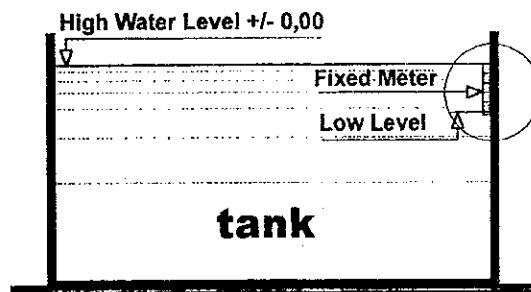
Construction form:

Round; D = 52,00 m; Hm = 3,48 m;

Construction material:

Reinforced concrete

Measurement Scheme



N° of Measurement	Date of Measurement	Time (h)	Measurement level (mm)	Δh E-R (mm)	Daily Loss (mm) (4)-(5)	Daily Loss Allowable (mm)	Leakage Factor "D" (6)/(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	13.07.99	0	0,00				
2	14.07.99	24	43,01	2,58	40,43	0,88	45,94
3	15.07.99	48	45,49	1,51	43,98	0,88	49,98
4	16.07.99	72	47,47	4,13	43,34	0,88	49,25
Average Value:					42,59	0,88	48,39 > 1,00

*Note: For above data, see next pages

Test Result: Tank Hydraulic test drain test is fail. Adequate additional reparation and drain protection of inside surfaces of tank is recommended, including output pipes and valves.

Sarajevo 07.16.99

Tested by:


Ekrem Velagic B.Sc.

4.3. Tank No 6.2. - Calculation of Daily Leakage from Tank

No of Meas.	Data of Measurement	Time of Measurement (h)	24h Correction Factor kt	Measurement Level (cm)	Δhm mm	Δhmk (4)x(6) mm	Evaporation and Rain (E-R) (mm)	D-loss (7)-(8) (mm/day)	Dhmax (mm/day)	Factor-Lf (9)/(8)	
(1.)	(2.)	(3.)	(4.)	(5.)	(6.)	(7.)	(8.)	(9.)	(10.)	(11.)	
1	13.07.99	16h00m	1	272,1			0	0			
2	14.07.99	9h30m	0,729	266,2	59	43,01	2,58	40,43	0,88	45,94	
3	16.07.99	9h15m	0,989	261,6	46	45,49	1,51	43,98	0,88	49,98	
4	16.07.99	9h30m	1,010	256,9	47	47,47	4,13	43,34	0,88	49,25	
								Average value-V:	42,59	0,88	48,39

B - 24

TEST CRITERIA:

Max. loss in 7 days no greater than 1/500 x Normal operating depth

Tank No 6.2. - Final Sedimentation Tank

No	Description	Unit	Date (D1)	E1 (mm)	Date (D2)	E2 (mm)	Date (D3)	E3 (mm)	Date (D4)	E4 (mm)
a	Water temperature (tw)	(C)	23,000	12,624	23,500	12,624	23,500	12,624	23,500	12,624
b	Max. vapor pressure (V)	(in.)	0,840	(1-1,32*0,01pa)	0,866	(1-1,32*0,01pa)	0,866	(1-1,32*0,01pa)	0,866	(1-1,32*0,01pa)
c	Air temperature (ta)	(C)	22,100	0,629	20,600	0,631	18,900	0,629	17,700	0,628
d	Relative humidity	(%)	65,000	(1+0,268w)	71,600	(1+0,268w)	62,400	(1+0,268w)	61,700	(1+0,268w)
e	Vapor pressure (v)	(in)	0,663	1,839	0,73	2,378	0,636	2,198	0,639	2,294
f	Wind velocity (w)	(mph)	3,13	(V-v)	5,14	(V-v)	4,47	(V-v)	4,83	(V-v)
g	Barometric pressure (pa)	(in)	28,088	0,177	27,960	0,136	28,124	0,23	28,216	0,227
			07.13.99	2,59	07.14.99	2,58	07.15.99	4,01	07.16.99	4,13
E (mm)				0,00		0,00		2,50		0,00
R (mm)				2,59		2,58		1,51		4,13
E-R (mm)										

HYDRAULIC TEST DRAIN TEST

INSPECTION SHEET

Object:

Tank N° 6.3 – Final Sedimentation Tank

Capacity:

7.400,00 m³

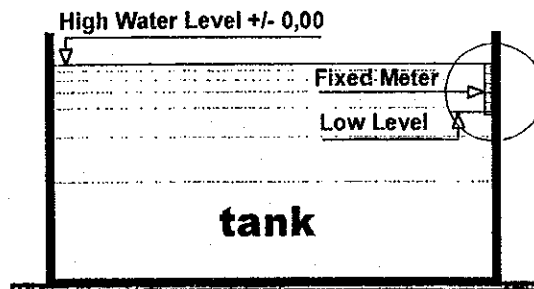
Construction form:

Round; D = 52,00 m; Hm = 3,48 m;

Construction material:

Reinforced concrete

Measurement Scheme



N° of Measurement	Date of Measurement	Time (h)	Measurement level (mm)	Δh E-R (mm)	Daily Loss (mm) (4)-(5)	Daily Loss Allowable (mm) (7)	Leakage Factor "D" (6)/(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	13.07.99	0	0,00				
2	14.07.99	24	13,12	2,58	10,54	0,88	11,98
3	15.07.99	48	12,86	1,51	11,35	0,88	12,89
4	16.07.99	72	15,15	4,13	11,02	0,88	12,52
Average Value:					10,97	0,88	12,47 > 1,00

*Note: For above data, see next pages

Test Result: Tank Hydraulic test drain test is fail. Adequate additional reparation and drain protection of inside surfaces of tank is recommended, including output pipes and valves.

Sarajevo 07.16.99

Tested by:


Ekrem Velagic B.Sc.

4.4. Tank No 6.3. - Calculation of Daily Leakage from Tank

No of Meas.	Data of Measurement	Time of Measurement (h)	24h Correction Factor kt	Measurement Level (cm)	Δh_m mm	Δh_{mk} (4)x(6) mm	Evaporation and Rain (E-R) (mm)	D-loss (7)-(8) (mm/day)	Dhmax (mm/day)	Factor-Lf (9)/(8)
(1.)	(2.)	(3.)	(4.)	(5.)	(6.)	(7.)	(8.)	(9.)	(10.)	(11.)
1	13.07.99	16h00m	1	478,6			0	0		
2	14.07.99	9h30m	0,729	476,8	18	13,12	2,58	10,54	0,88	11,98
3	16.07.99	9h15m	0,989	475,5	13	12,86	1,51	11,35	0,88	12,89
4	16.07.99	9h30m	1,010	474,0	15	15,15	4,13	11,02	0,88	12,52
Average value-V:								10,97	0,88	12,47

TEST CRITERIA:

Max. loss in 7 days no greater than 1/500 x Normal operating depth

Tank No 6.3. - Final Sedimentation Tank

No.	Description	Unit	Date (D1)	E1 (mm)	Date (D2)	E2 (mm)	Date (D3)	E3 (mm)	Date (D4)	E4 (mm)
a	Water temperature (tw)	(C)	23,000	12,624	23,500	12,624	23,500	12,624	23,500	12,624
b	Max. vapor pressure (V)	(in.)	0,840	(1-1,32*0,01pa)	0,866	(1-1,32*0,01pa)	0,866	(1-1,32*0,01pa)	0,866	(1-1,32*0,01pa)
c	Air temperature (ta)	(C)	22,100	0,629	20,600	0,631	18,900	0,629	17,700	0,628
d	Relative humidity	(%)	65,000	(1+0,268w)	71,600	(1+0,268w)	62,400	(1+0,268w)	61,700	(1+0,268w)
e	Vapor pressure (v)	(in)	0,663	1,839	0,73	2,378	0,636	2,198	0,639	2,294
f	Wind velocity (w)	(mph)	3,13	(V-v)	5,14	(V-v)	4,47	(V-v)	4,83	(V-v)
g	Barometric pressure (pa)	(in)	28,088	0,177	27,960	0,136	28,124	0,23	28,216	0,227
E (mm)			07.13.99	2,59	07.14.99	2,58	07.15.99	4,01	07.16.99	4,13
R (mm)				0,00		0,00		2,50		0,00
E-R (mm)				2,59		2,58		1,51		4,13

HYDRAULIC TEST DRAIN TEST

INSPECTION SHEET

Object:

Tank N° 6.4 – Final Sedimentation Tank

Capacity:

7.400,00 m³

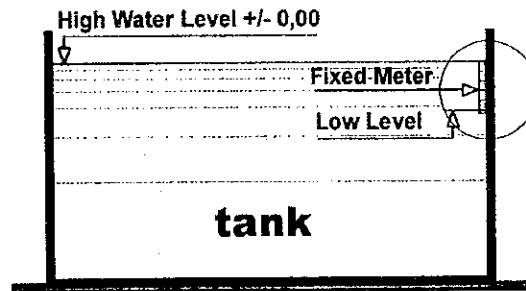
Construction form:

Round; D = 52,00 m; Hm = 3,48 m;

Construction material:

Reinforced concrete

Measurement Scheme



N ^o of Measurement	Date of Measurement	Time (h)	Measurement level (mm)	Δh E-R (mm)	Daily Loss (mm) (4)-(5)	Daily Loss Allowable (mm) (7)	Leakage Factor "D" (6)/(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	13.07.99	0	0,00				
2	14.07.99	24	131,22	2,58	128,64	0,88	146,18
3	15.07.99	48	138,46	1,51	136,95	0,88	155,63
4	16.07.99	72	137,36	4,13	133,23	0,88	151,40
Average Value:					132,94	0,88	151,07 > 1,00

*Note: For above data, see next pages

Test Result: Tank Hydraulic test drain test is fail. Adecvate additional reparation and drain protection of inside surfaces of tank is recommended, including output pipes and valves.

Sarajevo 07.16.99

Tested by:


Ekrem Velagic B.Sc.

4.5. Tank No 6.4. - Calculation of Daily Leakage from Tank

No of Meas.	Data of Measurement	Time of Measurement (h)	24h Correction Factor kt	Measurement Level (cm)	Δh_m mm	Δh_{mk} (4)X(6) mm	Evaporation and Rain (E-R) (mm)	D-loss (7)-(8) (mm/day)	Dhmax (mm/day)	Factor-Lf (9)/(8)
(1.)	(2.)	(3.)	(4.)	(5.)	(6.)	(7.)	(8.)	(9.)	(10.)	(11.)
1	13.07.99	16h00m	1	371,4			0	0		
2	14.07.99	9h30m	0,729	353,4	180	131,22	2,58	128,64	0,88	146,18
3	16.07.99	9h15m	0,989	339,4	140	138,46	1,51	136,95	0,88	155,63
4	16.07.99	9h30m	1,010	325,8	136	137,36	4,13	133,23	0,88	151,40
Average value-V:								132,94	0,88	151,07

B - 30

TEST CRITERIA:

Max. loss in 7 days no greater then 1/500 x Normal operating depth

Tank No 6.4. - Final Sedimentation Tank

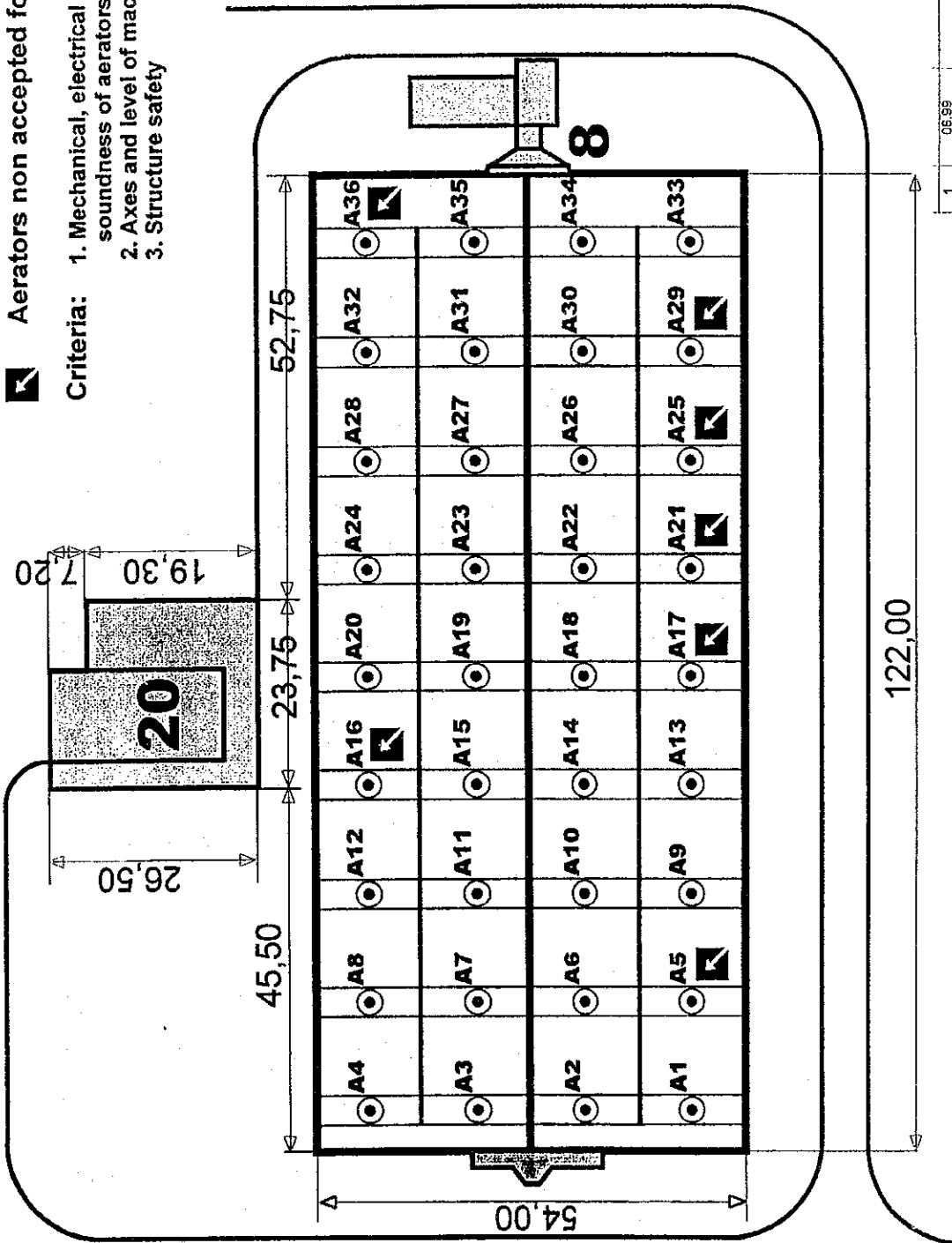
No	Description	Unit	Date (D1)	E1 (mm)	Date (D2)	E2 (mm)	Date (D3)	E3 (mm)	Date (D4)	E4 (mm)
a	Water temperature (tw)	(C)	23,000	12,624	23,500	12,624	23,500	12,624	23,500	12,624
b	Max. vapor pressure (V)	(in.)	0,840	(1-1,32*0,01pa)	0,866	(1-1,32*0,01pa)	0,866	(1-1,32*0,01pa)	0,866	(1-1,32*0,01pa)
c	Air temperature (ta)	(C)	22,100	0,629	20,600	0,631	18,900	0,629	17,700	0,628
d	Relative humidity	(%)	65,000	(1+0,268w)	71,600	(1+0,268w)	62,400	(1+0,268w)	61,700	(1+0,268w)
e	Vapor pressure (v)	(in)	0,663	1,839	0,73	2,378	0,636	2,198	0,639	2,294
f	Wind velocity (w)	(mph)	3,13	(N-v)	5,14	(N-v)	4,47	(N-v)	4,83	(N-v)
g	Barometric pressure (pa)	(in)	28,088	0,177	27,960	0,136	28,124	0,23	28,216	0,227
			07.13.99	2,59	07.14.99	2,58	07.15.99	4,01	07.16.99	4,13
E (mm)				0,00		0,00		2,50		0,00
R (mm)				2,59		2,58		1,51		4,13
E-R (mm)										

**APPENDIX
C**

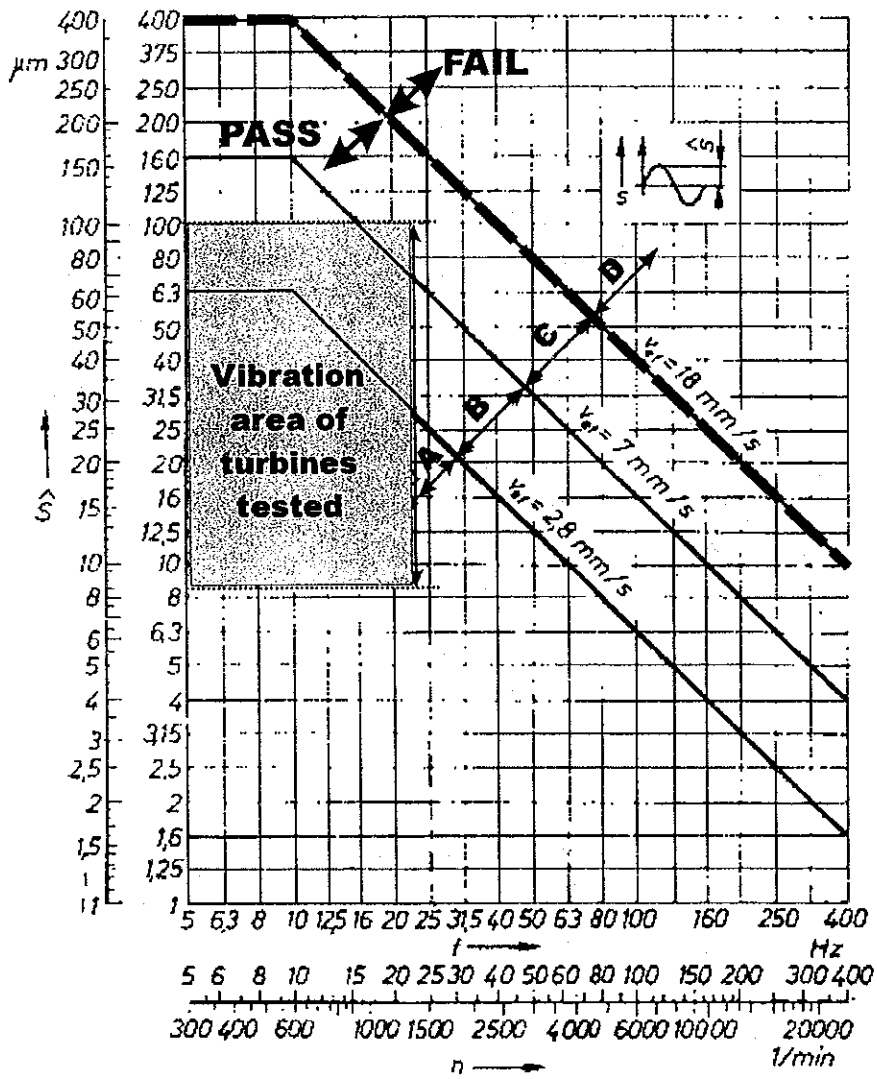
**SURFACE
AERATOR TEST**

☑ Aerators non accepted for testing

- Criteria:**
1. Mechanical, electrical or soundness of aerators
 2. Axes and level of machine
 3. Structure safety



1	05.99	IZMJENE	CRTAO	ODOBRIO
REV.	DATE	IZMJENE	CRTAO	ODOBRIO
THE WASTE WATER TREATMENT PLANT OF SARAJEVO CITY CLIENT: JICA STUDY TEAM			AERATION TANK -SCHEME OF AERATORS FOR TESTING-	
USB KEDLY				5114 00 001102 REV.11



AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 28. 06.1999. Time of testing:

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A1		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer: DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel	
Service: air supply for biological treatment	Duty: permanent	Corrosive protection: epoxi painted	
Turbine diameter: 1700,00 mm	Installation: out door	Turbine speed: 51,9 tr/min	

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:	
Manufacturer number: FL 256280	Production Year: 1980	Lot : VJULJ 225 S4 1/1980	
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A Cos φ: 0,87	n/min: 1465	
Service: turbine drive	Installation: out door	Duty: permanent	

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10686 - A69BM51		Ratio: 1465/51,9/28,528
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	10	10		
Insulation resistance:			Pass		
Terminals:			Pass		
Abnormal Sound:					
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R	S	T
Speed:	O/min				
Vibration:	µm				
Oil temperature:					
El. mot. overheating:					
Coupling:			Fail		
Anchor bolts:		Pass			

5. TEST RESULT:

Fail

Verified by:

Posovac Franjo
Posovac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A1		380 V	37 kW	70 A	0,87	1465
		50 Hz				
		Number/Broj: FL 256280		Lot as VJULJ 225 S4 1/1980		
	Manufacturer/ Proizvođač	CEM - Cie Electro- Mecanique, France				
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

A - Test insulation resistance between spools;
 B - Test insulation resistance between spools and ground;
 C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 MOhm;**Pass**

Tested by:

Posavac Franjo

 Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 28.06.1999. Time of testing: 16³⁰ - 18³⁰

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A2		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer: DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel	
Service: air supply for biological treatment	Duty: permanent	Corrosive protection: epoxi painted	
Turbine diameter: 1700,00 mm	Installation: out door	Turbine speed: 51,9 tr/min	

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:	
Manufacturer number: FL 256279	Production Year: 1980	Lot: VJULJ 225 S4 1/1980	
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A Cos φ: 0,87	n/min: 1465	
Service: turbine drive	Installation: out door	Duty: permanent	

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10682 - A68AM50		Ratio: 1465/51,9/28,528
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	10	10		
Insulation resistance:			Pass		
Terminals:			Pass		
Abnormal Sound:		Pass			
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R: 42	S: 41,5	T: 42
Speed:	O/min	52			
Vibration:	µm	100	100		
Oil temperature:	°C	42 (22,5)			
El. mot. overheating:					
Coupling:			Pass		
Anchor bolts:		Pass			

5. TEST RESULT:

Pass

Verified by:

Posavac Franjo

Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja:

19.06.1999.

2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A2		380 V	37 kW	70 A	0,87	1465
		50 Hz				
		Number/Broj:	FL 256279	Lot as	VJULJ 225 S4 1/1980	
	Manufacturer/ Proizvođač	CEM - Cie Electro- Mecanique, France				
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

- A - Test insulation resistance between spools;
- B - Test insulation resistance between spools and ground;
- C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;

Pass

Tested by:

Posavac Franjo

Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 30. 06.1999. Time of testing:

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A3		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer: DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel	
Service: air supply for biological treatment	Duty: permanent	Corrosive protection: epoxi painted	
Turbine diameter: 1700,00 mm	Installation: out door	Turbine speed: 51,9 tr/min	

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:	
Manufacturer number: FL 256261	Production Year: 1980	Lot : VJULJ 225 S4 1/1980	
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A Cos φ: 0,87	n/min: 1465	
Service: turbine drive	Installation: out door	Duty: permanent	

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10664 - A68AM32		Ratio: 1465/51,9/28,528
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	10	10		
Insulation resistance:			Pass		
Terminals:			Pass		
Abnormal Sound:					
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R:	S:	T:
Speed:	O/min				
Vibration:	µm				
Oil temperature:	°C				
El. mot. overheating:					
Coupling:			Fail		
Anchor bolts:		Pass			

5. TEST RESULT:

Fail

Verified by:

Posavac Franjo

Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A3		380 V	37 kW	70 A	0,87	1465
		50 Hz				
	Manufacturer/ Proizvođač	Number/Broj: FL 256261 Lot as VJULJ 225 S4 1/1980 CEM - Cie Electro- Mecanique, France				
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

A - Test insulation resistance between spools;
 B - Test insulation resistance between spools and ground;
 C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;**Pass**

Tested by:

Posavac Franjo
 Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 30. 06.1999. Time of testing:

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A4		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer: DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel	
Service: air supply for biological treatment	Duty: permanent	Corrosive protection: epoxi painted	
Turbine diameter: 1700,00 mm	Installation: out door	Turbine speed: 51,9 tr/min	

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:	
Manufacturer number: FL 256262	Production Year: 1980	Lot : VJULJ 225 S4 1/1980	
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A Cos φ: 0,87	n/min: 1465	
Service: turbine drive	Installation: out door	Duty: permanent	

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10665 - A69AM33	Ratio: 1465/51,9/28,528	
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	10	10		
Insulation resistance:			Pass		
Terminals:			Pass		
Abnormal Sound:					
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R:	S:	T:
Speed:	O/min				
Vibration:	µm				
Oil temperature:	°C				
El. mot. overheating:					
Coupling:			Fail		
Anchor bolts:		Pass			

5. TEST RESULT:

Fail

Verified by:

Posavac Franjo
 Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A4		380 V	37 kW	70 A	0,87	1465
		50 Hz				
		Number/Broj:	FL 256262	Lot as	VJULJ 225 S4 1/1980	
Manufacturer/ Proizvođač	CEM - Cie Electro- Mecanique, France					
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

A - Test insulation resistance between spools;
 B - Test insulation resistance between spools and ground;
 C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;**Pass**

Tested by:

Posavac Franjo

 Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing:

Time of testing:

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A5		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer:	DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel
Service: air supply for biological treatment	Duty:	permanent	Corrosive protection: epoxi painted
Turbine diameter: 1700,00 mm	Installation:	out door	Turbine speed: 51,9 tr/min

Elektro Motore:		
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:
Manufacturer number:	Production Year: 1980	Lot: VJULJ 225 S4 1/1980
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A Cos φ: 0,87	n/min: 1465
Service: turbine drive	Installation: out door	Duty: permanent

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10624 - A70BM72		Ratio: 1465/51,9/28,528
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:					
Corrosion:	%				
Insulation resistance:					
Terminals:					
Abnormal Sound:					
Bearings:					
Shafts:					
Gears:					
Electricity:	A		R:	S:	T:
Speed:	O/min				
Vibration:	µm				
Oil temperature:	°C				
El. mot. overheating:					
Coupling:					
Anchor bolts:					

5. NOTE:

Turbine without electro motor

Verified by:

Posavac Franjo
Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.

2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A5		380 V	37 kW	70 A	0,87	1465
		50 Hz				
		Number/Broj:		Lot as		
	Manufacturer/ Proizvođač	CEM - Cie Electro- Mecanique, France				
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

- A - Test insulation resistance between spools;
- B - Test insulation resistance between spools and ground;
- C - Test of continuous of spools:

	A	MOhm
1.		
2.		
3.		

	B	MOhm
4.		
5.		
6.		

	C	MOhm
7.		
8.		
9.		

5. Note/Napomena:

There is no Motor of Aerator; No Test

Tested by:

Posavac Franjo
 Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 28. 06.1999. Time of testing:

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A6		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer: DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel	
Service: air supply for biological treatment	Duty: permanent	Corrosive protection: epoxi painted	
Turbine diameter: 1700,00 mm	Installation: out door	Turbine speed: 51,9 tr/min	

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:	
Manufacturer number: FL 256278	Production Year: 1980	Lot : VJULJ 225 S4 1/1980	
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A Cos φ: 0,87	n/min: 1465	
Service: turbine drive	Installation: out door	Duty: permanent	

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10681 - A67BM49		Ratio: 1465/51,9/28,528
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	10	10		
Insulation resistance:			Pass		
Terminals:			Pass		
Abnormal Sound:					
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R:	S:	T:
Speed:	O/min				
Vibration:	µm				
Oil temperature:	°C				
El. mot. overheating:					
Coupling:			Fail		
Anchor bolts:		Pass			

5. TEST RESULT:

Fail

Verified by:

Posavac Franjo
Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A6		380 V	37 kW	70 A	0,87	1465
		50 Hz				
		Number/Broj:	FL 256278	Lot as	VJULJ 225 S4	1/1980
	Manufacturer/ Proizvođač	CEM - Cie Electro- Mecanique, France				
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

A - Test insulation resistance between spools;
 B - Test insulation resistance between spools and ground;
 C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;**Pass**

Tested by:

Posavac Franjo
 Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 03. 07.1999. Time of testing: 08³⁰ - 10³⁰

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A7		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer: DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel	
Service: air supply for biological treatment	Duty: permanent	Corrosive protection: epoxi painted	
Turbine diameter: 1700,00 mm	Installation: out door	Turbine speed: 51,9 tr/min	

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:	
Manufacturer number: FL 256260	Production Year: 1980	Lot : VJULJ 225 S4 1/1980	
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A Cos φ: 0,87	n/min: 1465	
Service: turbine drive	Installation: out door	Duty: permanent	

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10663 - A67AM31		Ratio: 1465/51,9/28,528
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	20	20		
Insulation resistance:			Pass		
Terminals:			Pass		
Abnormal Sound:		Pass			
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R: 48	S: 47	T: 48
Speed:	O/min	52	1465		
Vibration:	µm	95	95		
Oil temperature:	°C	41 (23,6)			
El. mot. overheating:			Pass		
Coupling:			Pass		
Anchor bolts:		Pass			

5. TEST RESULT:

Pass

Verified by:

Posavac Franjo

Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.

2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A7		380 V	37 kW	70 A	0,87	1465
		50 Hz				
	Manufacturer/ Proizvođač	Number/Broj: FL 256260 Lot as VJULJ 225 S4 1/1980 CEM - Cie Electro- Mecanique, France				
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

A - Test insulation resistance between spools;
 B - Test insulation resistance between spools and ground;
 C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;

Pass

Note*: Terminal is broken

Tested by:

Posavac Franjo
 Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 03. 07.1999. Time of testing: 10⁴⁵ - 12⁴⁵

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A8		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer: DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel	
Service: air supply for biological treatment	Duty: permanent	Corrosive protection: epoxi painted	
Turbine diameter: 1700,00 mm	Installation: out door	Turbine speed: 51,9 tr/min	

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:	
Manufacturer number: FL 266263	Production Year: 1980	Lot: VJULJ 225 S4 1/1980	
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A Cos φ: 0,87	n/min: 1465	
Service: turbine drive	Installation: out door	Duty: permanent	

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10666 - A70AM34		Ratio: 1465/51,9/28,528
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	10	10		
Insulation resistance:			Pass		
Terminals:			Pass		
Abnormal Sound:		Pass			
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R: 50	S: 51	T: 52
Speed:	O/min	52	1465		
Vibration:	µm	11,5	17,5		
Oil temperature:	°C	45 (25,2)			
El. mot. overheating:					
Coupling:			Pass		
Anchor bolts:		Pass			

5. TEST RESULT:

Pass

Verified by:

Posavac Franjo

Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A8		380 V	37 kW	70 A	0,87	1465
		50 Hz				
		Number/Broj:	FL 256263	Lot as	VJULJ 225 S4	1/1980
	Manufacturer/ Proizvođač	CEM - Cie Electro- Mecanique, France				
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

A - Test insulation resistance between spools;
 B - Test insulation resistance between spools and ground;
 C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;**Pass**

Tested by:

Posavac Franjo

 Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 28.06.1999. Time of testing: 14⁰⁵ - 16⁰⁶

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE		N° A9	
Location:		Aeration tank N° 5	
Aeration turbine type: Fixed position surface aerator	Manufacturer:	DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel
Service: air supply for biological treatment	Duty:	permanent	Corrosive protection: epoxi painted
Turbine diameter: 1700,00 mm	Installation:	out door	Turbine speed: 51,9 tr/min

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:	
Manufacturer number: FL 256282	Production Year: 1980	Lot : VJULJ 225 S4 1/1980	
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A Cos φ: 0,87	n/min: 1465	
Service: turbine drive	Installation: out door	Duty: permanent	

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10685 - A71BM53		Ratio: 1465/51,9/28,528
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	10	10		
Insulation resistance:			Pass		
Terminals:			Pass		
Abnormal Sound:		Pass			
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R: 39	S: 40	T: 39
Speed:	O/min	52	1465		
Vibration:	µm	100	100		
Oil temperature:	°C	41 (31,5)			
El. mot. overheating:					
Coupling:			Pass		
Anchor bolts:		Pass			

5. TEST RESULT:

Pass

Verified by:

Posavac Franjo

Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.

2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A9		380 V	37 kW	70 A	0,87	1465
		50 Hz				
	Manufacturer/ Proizvođač	Number/Broj: FL 256282 Lot as VJULJ 225 S4 1/1980 CEM - Cie Electro- Mecanique, France				
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

- A - Test insulation resistance between spools;
- B - Test insulation resistance between spools and ground;
- C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;

Pass

Note*: Terminal is broken

Tested by:

Posavac Franjo
 Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 28. 06.1999. Time of testing:

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A10		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer: DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel	
Service: air supply for biological treatment	Duty: permanent	Corrosive protection: epoxi painted	
Turbine diameter: 1700,00 mm	Installation: out door	Turbine speed: 51,9 tr/min	

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:	
Manufacturer number: FL 256277	Production Year: 1980	Lot : VJULJ 225 S4 1/1980	
Voltage: 380V; 50Hz	Power: 37 kW	Current: 70 A	Cos φ: 0,87
Service: turbine drive	Installation: out door	n/min: 1465	Duty: permanent

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10680 - A66AM48		Ratio: 1465/51,9/28,528
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	10	10		
Insulation resistance:			Pass		
Terminals:			Fail		
Abnormal Sound:					
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R:	S:	T:
Speed:	O/min				
Vibration:	µm				
Oil temperature:	°C				
El. mot. overheating:					
Coupling:			Fail		
Anchor bolts:		Pass			

5. TEST RESULT:

Fail

Verified by:

Posavac Franjo

Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.

2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A10		380 V	37 kW	70 A	0,87	1465
		50 Hz				
		Number/Broj: FL 256277		Lot as VJULJ 225 S4 1/1980		
	Manufacturer/ Proizvođač	CEM - Cie Electro- Mecanique, France				
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

- A - Test insulation resistance between spools;
- B - Test insulation resistance between spools and ground;
- C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;

Pass

Note*: Terminal is broken

Tested by:

Posavac Franjo
 Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 30. 06.1999. Time of testing:

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A11		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer:	DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel
Service: air supply for biological treatment	Duty:	permanent	Corrosive protection: epoxi painted
Turbine diameter: 1700,00 mm	Installation:	out door	Turbine speed: 51,9 tr/min

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer:	CEM-Cie Electro-Mecanique, France	Manufacturer type:
Manufacturer number: FL 256250	Production Year:	1980	Lot : VJULJ 226 S4 1/1980
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A	Cos φ: 0,87	n/min: 1465
Service: turbine drive	Installation:	out door	Duty: permanent

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10662 - A66AM30		Ratio: 1465/51,9/28,528
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	10	10		
Insulation resistance:			Pass		
Terminals:			Fail		
Abnormal Sound:					
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R:	S:	T:
Speed:	O/min				
Vibration:	µm °C				
Oil temperature:					
El. mot. overheating:					
Coupling:			Fail		
Anchor bolts:		Pass			

5. TEST RESULT:

Fail

Verified by:

Posavac Franjo

Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A11		380 V	37 kW	70 A	0,87	1465
		50 Hz				
		Number/Broj:	FL 256250	Lot as	VJULJ 225 S4	1/1980
	Manufacturer/ Proizvođač	CEM - Cie Electro- Mecanique, France				
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

A - Test insulation resistance between spools;
 B - Test insulation resistance between spools and ground;
 C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;**Pass**

Note*: Terminal is broken

Tested by:

Posavac Franjo

 Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 03. 07.1999. Time of testing: 13⁰⁰ - 15⁰⁰

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE		N° A12	
Location:		Aeration tank N° 5	
Aeration turbine type: Fixed position surface aerator	Manufacturer:	DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel
Service: air supply for biological treatment	Duty:	permanent	Corrosive protection: epoxi painted
Turbine diameter: 1700,00 mm	Installation:	out door	Turbine speed: 51,9 tr/min

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France		Manufacturer type:
Manufacturer number: FL 256264	Production Year:	1980	Lot : VJULJ 225 S4 1/1980
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A	Cos φ: 0,87	n/min: 1465
Service: turbine drive	Installation:	out door	Duty: permanent

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10667 - A71BM35		Ratio: 1465/51,9/28,528
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	20	20		
Insulation resistance:			Pass		
Terminals:			Pass		
Abnormal Sound:		Pass			
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R: 42	S: 41,5	T: 42
Speed:	O/min	52	1465		
Vibration:	µm	8,5	12		
Oil temperature:	°C	48 (27,1)			
El. mot. overheating:					
Coupling:			Pass		
Anchor bolts:		Pass			

5. TEST RESULT:

Pass

Verified by:

Posavac Franjo

Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.

2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
2.2. N^o: JO 33712 DB CE A185606111
2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A12		380 V	37 kW	70 A	0,87	1465
		50 Hz				
		Number/Broj:	FL 256264	Lot as	VJULJ 225 S4	1/1980
Manufacturer/ Proizvođač	CEM - Cie Electro- Mecanique, France					
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

A – Test insulation resistance between spools;
B - Test insulation resistance between spools and ground;
C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;

Pass

Note*: Terminal is broken

Tested by:

Posavac Franjo
Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 28. 06.1999. Time of testing: 11⁴⁵ - 13⁴⁵

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A13		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer: DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel	
Service: air supply for biological treatment	Duty: permanent	Corrosive protection: epoxi painted	
Turbine diameter: 1700,00 mm	Installation: out door	Turbine speed: 51,9 tr/min	

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:	
Manufacturer number: FL 256283	Production Year: 1980	Lot : VJULJ 225 S4 1/1980	
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A Cos φ: 0,87	n/min: 1465	
Service: turbine drive	Installation: out door	Duty: permanent	

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10686 - A72BM54	Ratio: 1465/51,9/28,528	
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	10	20		
Insulation resistance:			Pass		
Terminals:			Fail		
Abnormal Sound:		Pass			
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R: 42	S: 41,5	T: 41,5
Speed:	n/min	52	1465		
Vibration:	µm	100	100		
Oil temperature:	°C	47 (30,4)			
El. mot. overheating:					
Coupling:		Pass			
Anchor bolts:		Pass			

5. TEST RESULT:

Pass

Verified by:

Posavac Franjo

Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.

2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A13		380 V	37 kW	70 A	0,87	1465
		50 Hz				
		Number/Broj:	FL 256283	Lot as	VJULJ 225 S4	1/1980
Manufacturer/ Proizvođač	CEM - Cie Electro- Mecanique, France					
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

A - Test insulation resistance between spools;
 B - Test insulation resistance between spools and ground;
 C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;

Pass

Note*: Terminal is broken

Tested by:

Posavac Franjo

Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 28. 06.1999. Time of testing:

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A14		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer: DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel	
Service: air supply for biological treatment	Duty: permanent	Corrosive protection: epoxi painted	
Turbine diameter: 1700,00 mm	Installation: out door	Turbine speed: 51,9 tr/min	

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:	
Manufacturer number: FL 256276	Production Year: 1980	Lot : VJULJ 225 S4 1/1980	
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A Cos φ: 0,87	n/min: 1465	
Service: turbine drive	Installation: out door	Duty: permanent	

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10679 - A65BM47		Ratio: 1465/51,9/28,528
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	10	10		
Insulation resistance:			Pass		
Terminals:			Fail		
Abnormal Sound:					
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R:	S:	T:
Speed:	n/min				
Vibration:	µm				
Oil temperature:	°C				
El. mot. overheating:					
Coupling:			Fail		
Anchor bolts:		Pass			

5. TEST RESULT:

Fail

Verified by:

Posavac Franjo

Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja:

19.06.1999.

2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A14		380 V	37 kW	70 A	0,87	1465
		50 Hz				
	Manufacturer/ Proizvođač	Number/Broj: FL 256276 Lot as VJULJ 225 S4 1/1980 CEM - Cie Electro-Mecanique, France				
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

A - Test insulation resistance between spools;
 B - Test insulation resistance between spools and ground;
 C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;

Pass

Note*: Terminal is broken

Tested by:

Posavac Franjo

 Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 03. 07.1999. Time of testing: 15²⁰ - 17³⁰

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A15		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer: DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel	
Service: air supply for biological treatment	Duty: permanent	Corrosive protection: epoxi painted	
Turbine diameter: 1700,00 mm	Installation: out door	Turbine speed: 51,9 tr/min	

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:	
Manufacturer number: FL 256258	Production Year: 1980	Lot : VJULJ 225 S4 1/1980	
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A Cos φ: 0,87	n/min: 1465	
Service: turbine drive	Installation: out door	Duty: permanent	

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10661 - A65AM20	Ratio: 1465/51,9/28,528	
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Pass	Pass		
Corrosion:	%	10	10		
Insulation resistance:			Pass		
Terminals:			Fail		
Abnormal Sound:		Pass			
Bearings:		Pass	Pass		
Shafts:		Pass			
Gears:		Pass			
Electricity:	A		R: 54	S: 52	T: 54
Speed:	n/min	52	1465		
Vibration:	µm	10	8		
Oil temperature:	°C	48 (28,1)			
El. mot. overheating:					
Coupling:			Pass		
Anchor bolts:		Pass			

5. TEST RESULT:

Pass

Verified by:

Posavac Franjo
Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.

2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
 2.2. N^o: JO 33712 DB CE A185606111
 2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A15		380 V	37 kW	70 A	0,87	1465
		50 Hz				
	Number/Broj:	FL 256258		Lot as	VJULJ 225 S4 1/1980	
	Manufacturer/ Proizvođač	CEM - Cie Electro- Mecanique, France				
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

- A - Test insulation resistance between spools;
- B - Test insulation resistance between spools and ground;
- C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;

Pass

Note*: Terminal is broken

Tested by:

Posavac Franjo

 Posavac Franjo B.Sc.

AERATION TURBINE TEST LOAD INSPECTION SHEET

1. GENERAL

Date of testing: 28. 06.1999. Time of testing:

2. INSTRUMENT USED FOR MEASUREMENT (See Attachment)

3. EQUIPMENT TESTED DATA

AERATION TURBINE	N° A16		
Location:	Aeration tank N° 5		
Aeration turbine type: Fixed position surface aerator	Manufacturer: DEGREMONT	Materials (Shaft/Rotor): carbon steel/carbon steel	
Service: air supply for biological treatment	Duty: permanent	Corrosive protection: epoxi painted	
Turbine diameter: 1700,00 mm	Installation: out door	Turbine speed: 51,9 tr/min	

Elektro Motore:			
Electromotore type: Induction motor	Manufacturer: CEM-Cie Electro-Mecanique, France	Manufacturer type:	
Manufacturer number: FL 256265	Production Year: 1980	Lot: VJULJ 225 S4 1/1980	
Voltage: 380V; 50Hz Power: 37 kW	Current: 70 A Cos φ: 0,87	n/min: 1465	
Service: turbine drive	Installation: out door	Duty: permanent	

Coupling:		
Coupling type: Periflex	Manufacturer: TEXROPE France	Manufacturer type:

Gear Box:		
Gear box type: 2 step vertical shaft	Manufacturer: Hansen Patent France	Manufacturer type: NE 36 AN
Manufacturer number: E 10668 - A72AM36	Ratio: 1465/51,9/28,528	
Service: turbine drive	Installation: out door	Duty: permanent

4. TEST DATA

Description	Unit	GEAR BOX	ELECTRO MOTORE		
Figure:		Fail	Fail		
Corrosion:	%	10	10		
Insulation resistance:			Pass		
Terminals:			Pass		
Abnormal Sound:					
Bearings:					
Shafts:					
Gears:					
Electricity:	A		R:	S:	T:
Speed:	n/min				
Vibration:	µm				
Oil temperature:	°C				
El. mot. overheating:					
Coupling:			Pass		
Anchor bolts:		Fail			

5. TEST RESULT:

Fail

Verified by:

Posavac Franjo

Posavac Franjo B.Sc.

INSPECTION SHEET FOR INSULATION RESISTANCE

-KONTROLNI LIST ZA OTPOR IZOLACIJE-

1. Date of Testing/Datum ispitivanja: 19.06.1999.

2. Instrument used for measurement/Podatci o instrumentu za ispitivanje:

2.1. Type/Tip: Instalation Tester LEM
2.2. N^o: JO 33712 DB CE A185606111
2.3. Producer/Proizvođač: NORMA, Austria

3. Equipment tested/Podatci o testiranoj opremi:

Equipment/ Oprema	Induction motor/ Indukcioni motor	Voltage/ Napon:	Power/ Snaga:	Current/ Struja:	cos φ	n/min
Aerator N ^o : A16		380 V	37 kW	70 A	0,87	1465
		50 Hz				
		Number/Broj:	FL 256265	Lot as	VJULJ 225 S4	1/1980
	Manufacturer/ Proizvođač	CEM - Cie Electro- Mecanique, France				
Location/ Lokacija	Aeration tank No. 5					

4. Test Data/Podatci o ispitivanju:

A - Test insulation resistance between spools;
B - Test insulation resistance between spools and ground;
C - Test of continuous of spools:

	A	MOhm
1.	W2 - U2	> 100
2.	W2 - V2	> 100
3.	U2 - V2	> 100

	B	MOhm
4.	W2 - N	> 100
5.	U2 - N	> 100
6.	V2 - N	> 100

	C	MOhm
7.	U1 - U2	0,00
8.	V1 - V2	0,00
9.	W1 - W2	0,00

5. Test Result/Rezultati testa: A and B: > 0,38 MOhm (1000 Ohm/V); C ~ 0,00 Mohm;

Pass

Note*: Aerator out of axes

Tested by:

Posavac Franjo
Posavac Franjo B.Sc.