

## Appendix

### Biolog Plates – Raw Data

Figure A1 shows the set up of the 96 well Biolog GP2 plate with a full list of the contents of each well. Figures A2 to A5 show the raw data for *Exiguobacterium*, *H. blutaparouensis* and *S. warneri*.

A1 Water	A2 $\alpha$ -Cyclodextrin	A3 $\beta$ -Cyclodextrin	A4 Dextrin	A5 Glycogen	A6 Inulin	A7 Mannan	A8 Tween 40	A9 Tween 80	A10 N-Acetyl-D-Glucosamine	A11 N-Acetyl-D-Mannosamine	A12 Amygdalin
B1 L-Arabinose	B2 D-Arabitol	B3 Arbutin	B4 D-Cellobiose	B5 D-Fructose	B6 L-Fucose	B7 D-Galactose	B8 D-Galacturonic Acid	B9 Gentiobiose	B10 D-Gluconic Acid	B11 $\alpha$ -D-Glucose	B12 m-Inositol
C1 $\alpha$ -D-Lactose	C2 Lactulose	C3 Maltose	C4 Maltotriose	C5 D-Mannitol	C6 D-Mannose	C7 D-Melezitose	C8 D-Melibiose	C9 $\alpha$ -Methyl D-Galactoside	C10 $\beta$ -Methyl D-Galactoside	C11 3-Methyl Glucose	C12 $\alpha$ -Methyl D-Glucoside
D1 $\beta$ -Methyl D-Glucoside	D2 $\alpha$ -Methyl D-Mannoside	D3 Palatinose	D4 D-Psicose	D5 D-Raffinose	D6 L-Rhamnose	D7 D-Ribose	D8 Salicin	D9 Sedoheptulosan	D10 D-Sorbitol	D11 Stachyose	D12 Sucrose
E1 D-Tagatose	E2 D-Trehalose	E3 Turanose	E4 Xylitol	E5 D-Xylose	E6 Acetic Acid	E7 $\alpha$ -Hydroxy Butyric Acid	E8 $\beta$ -Hydroxy Butyric Acid	E9 $\gamma$ -Hydroxy Butyric Acid	E10 p-Hydroxy Phenyl Acetic Acid	E11 $\alpha$ -Keto Glutaric Acid	E12 $\alpha$ -Keto Valeric Acid
F1 Lactamide	F2 D-Lactic Acid Methyl Ester	F3 L-Lactic Acid	F4 D-Malic Acid	F5 L-Malic Acid	F6 Methyl Pyruvate	F7 Mono-methyl Succinate	F8 Propionic Acid	F9 Pyruvic Acid	F10 Succinamic Acid	F11 Succinic Acid	F12 N-Acetyl L-Glutamic Acid
G1 L-Alaninamide	G2 D-Alanine	G3 L-Alanine	G4 L-Alanyl-glycine	G5 L-Asparagine	G6 L-Glutamic Acid	G7 Glycyl- L-Glutamic Acid	G8 L-Pyrogglutamic Acid	G9 L-Serine	G10 Putrescine	G11 2,3-Butanediol	G12 Glycerol
H1 Adenosine	H2 2'-Deoxy Adenosine	H3 Inosine	H4 Thymidine	H5 Uridine	H6 Adenosine-5'- Monophosphate	H7 Thymidine-5'- Monophosphate	H8 Uridine-5'- Monophosphate	H9 Fructose-6- Phosphate	H10 Glucose-1- Phosphate	H11 Glucose-6- Phosphate	H12 D-L- $\alpha$ -Glycerol Phosphate

Figure A1. The standard contents of a 96 well Gram-positive Biolog plate, where A1 contains water as a control well.

0.317	0.339	0.388	0.383	0.296	0.366	0.332	0.449	0.400	0.275	0.303	0.336
0.325	0.277	0.300	0.363	0.258	0.284	0.212	0.264	0.318	0.269	0.216	0.337
0.435	0.321	0.325	0.334	0.319	0.376	0.374	0.297	0.339	0.381	0.406	0.410
0.341	0.356	0.286	0.327	0.318	0.359	0.310	0.343	0.348	0.317	0.403	0.424
0.319	0.338	0.363	0.328	0.318	0.377	0.401	0.447	0.443	0.335	0.473	0.436
0.362	0.411	0.487	0.404	0.422	0.396	0.429	0.464	0.602	0.456	0.450	0.434
0.395	0.375	0.374	0.413	0.339	0.419	0.398	0.408	0.413	0.444	0.496	0.448
0.326	0.359	0.382	0.370	0.393	0.405	0.396	0.462	0.512	0.510	0.538	0.489

**Figure A2.** *Exiguobacterium* AL2 OD<sub>595</sub> values obtained after overnight incubation.

0.358	0.375	0.360	0.381	0.342	0.335	0.396	0.431	0.444	0.283	0.349	0.381
0.358	0.219	0.297	0.273	0.220	0.257	0.195	0.298	0.272	0.280	0.234	0.329
0.413	0.327	0.349	0.359	0.344	0.303	0.386	0.359	0.460	0.398	0.355	0.375
0.389	0.306	0.250	0.345	0.319	0.350	0.401	0.369	0.370	0.405	0.371	0.425
0.313	0.278	0.313	0.322	0.307	0.342	0.359	0.436	0.472	0.401	0.432	0.471
0.357	0.339	0.353	0.305	0.358	0.338	0.438	0.484	0.487	0.374	0.344	0.438
0.350	0.318	0.341	0.365	0.327	0.382	0.364	0.437	0.514	0.356	0.508	0.458
0.394	0.321	0.346	0.337	0.339	0.473	0.459	0.451	0.556	0.511	0.496	0.476

**Figure A3.** *Exiguobacterium* ABr1 OD<sub>595</sub> values obtained after overnight incubation.

0.986	0.879	0.974	0.462	1.343	1.236	0.423	1.929	1.980	1.365	1.327	1.128
0.572	0.993	0.945	1.152	0.986	1.239	1.293	1.408	1.448	1.492	1.421	1.324
1.042	1.110	0.904	1.146	1.193	1.190	1.384	1.462	1.460	1.526	1.371	1.229
1.048	1.118	0.509	0.971	1.134	1.306	1.095	1.206	1.412	1.509	1.504	1.341
0.492	0.996	0.899	1.237	0.759	1.202	1.392	1.405	1.495	1.355	1.474	1.281
0.814	0.926	1.046	0.920	0.917	1.060	1.215	1.276	1.225	1.253	1.375	1.124
0.809	0.830	0.754	1.053	1.005	0.946	1.393	1.251	1.348	1.021	1.161	1.045
0.555	0.626	0.764	0.644	0.768	0.824	0.762	0.946	0.897	0.981	1.145	1.016

**Figure A4.** *Halobacillus blutaparonensis* (4M6) OD<sub>595</sub> values after overnight incubation.

0.492	0.434	0.615	0.349	0.584	0.449	1.261	1.173	1.771	0.550	0.549	0.400
0.380	0.605	0.352	0.492	0.442	0.338	0.428	0.854	0.808	0.754	0.670	0.524
0.557	0.479	0.403	0.422	0.438	0.395	0.475	0.672	0.564	0.610	0.469	0.537
0.919	0.939	0.724	0.794	0.897	0.790	1.010	0.863	0.793	0.839	0.798	0.847
0.662	0.858	1.003	1.060	0.761	0.890	1.064	0.932	0.842	0.648	1.001	0.818
0.964	0.968	1.075	0.916	0.989	0.946	1.050	0.773	0.901	0.912	0.924	0.871
0.986	0.968	0.948	1.017	1.055	0.948	1.030	0.963	0.987	0.884	0.817	0.940
0.780	0.824	0.948	0.890	0.826	0.846	0.951	0.832	0.900	0.901	0.958	0.806

**Figure A5.** *Staphylococcus warneri* (4.c FLTR) OD<sub>595</sub> values after overnight incubation.

## Sampling Sites in Hassa, Saudi Arabia



**Figure A6.** The last point for the water flow prior to the entrance to the Alasfar lake



**Figure A7.** One of the sampling points before reaching the lake.





**Figure A8.** One of the points of collection of samples before reaching the lake



**Figure A9.** Alasfar Lake, Hassa, Saudi Arabia.



**Figure A10.** One of the sampling points of Alasfar Lake, Hassa, Saudi Arabia.



## **Standard Solutions Used:**

### **1. CTAB buffer**

2% CTAB (hexadecyltrimethylammonium bromide)

100 mM TrisHCl [pH=8]

20 mM EDTA,

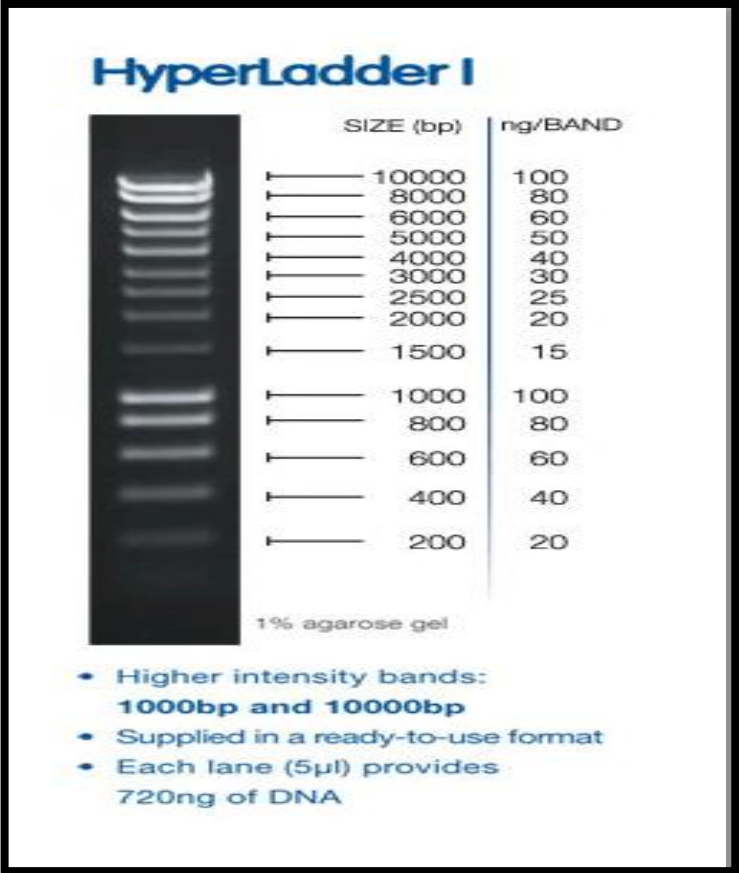
1.4 M NaCl

2%  $\beta$ -mercaptoethanol [added just before use]

### **2. 50 $\times$ TAE buffer**

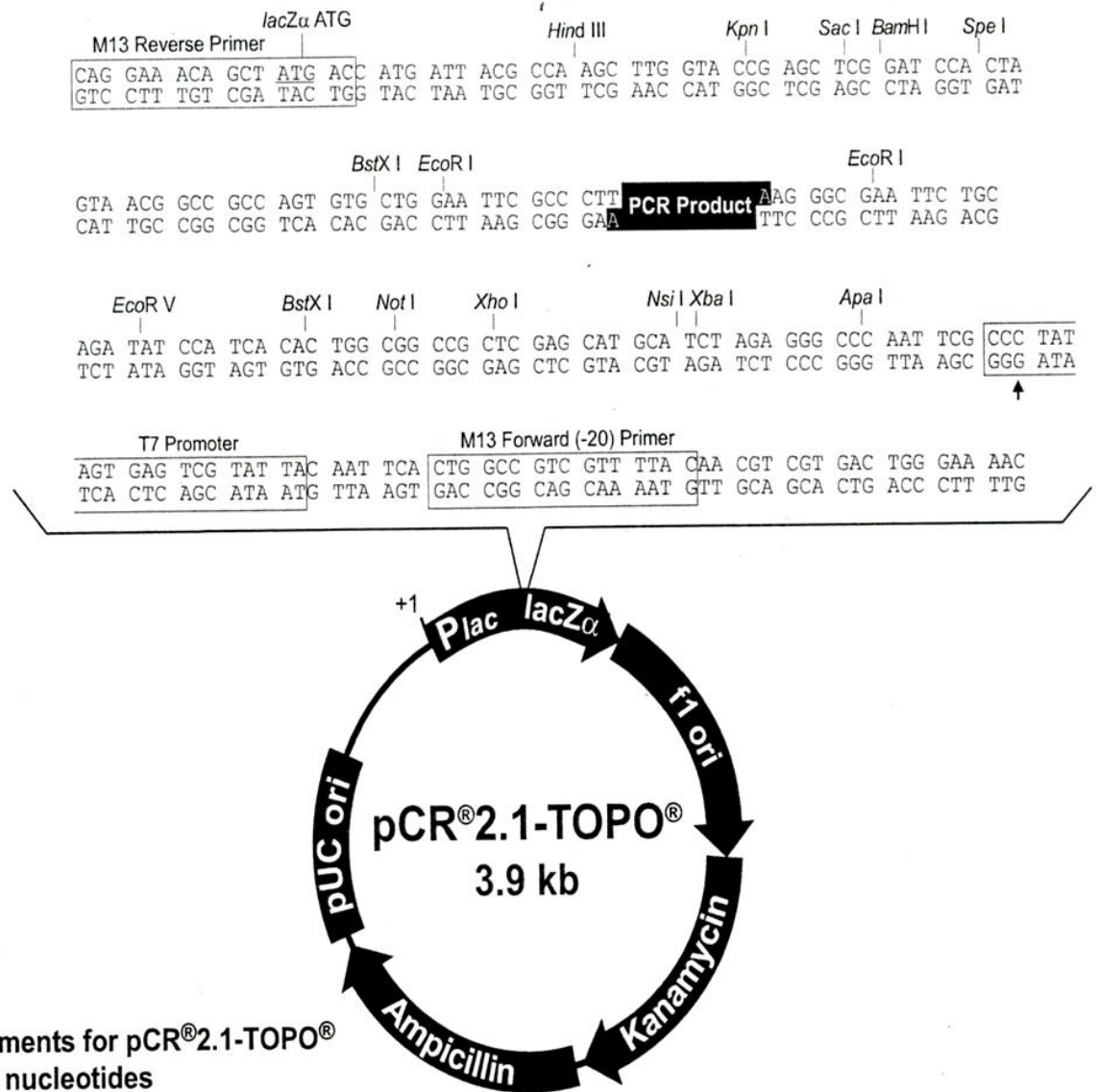
242 g Tris base, 57.1 ml Glacial Acetic Acid and 18.6 g EDTA are added to 900 ml dH<sub>2</sub>O before adjusting the final volume to 1 litre with additional dH<sub>2</sub>O. This solution is diluted 1 in 50 to produce 1 X TAE suitable for use as an electrophoresis buffer.

# Standard Hyperladder



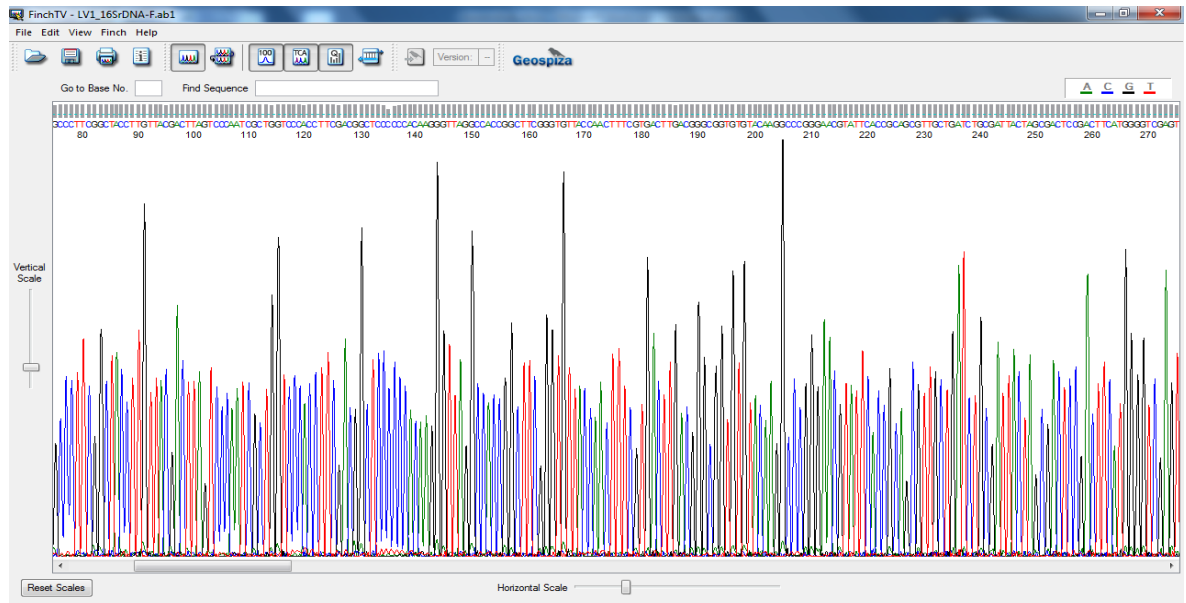
**Figure A11.** Standard HyperLadder I produces a pattern of 14 regularly spaced bands (10000, 8000, 6000, 5000, 4000, 3500, 3000, 2500, 2000, 1500, 1000, 800, 600, 400 and 200 bp).

## Plasmid pCR 2.1 TOPO (3.9 kb)

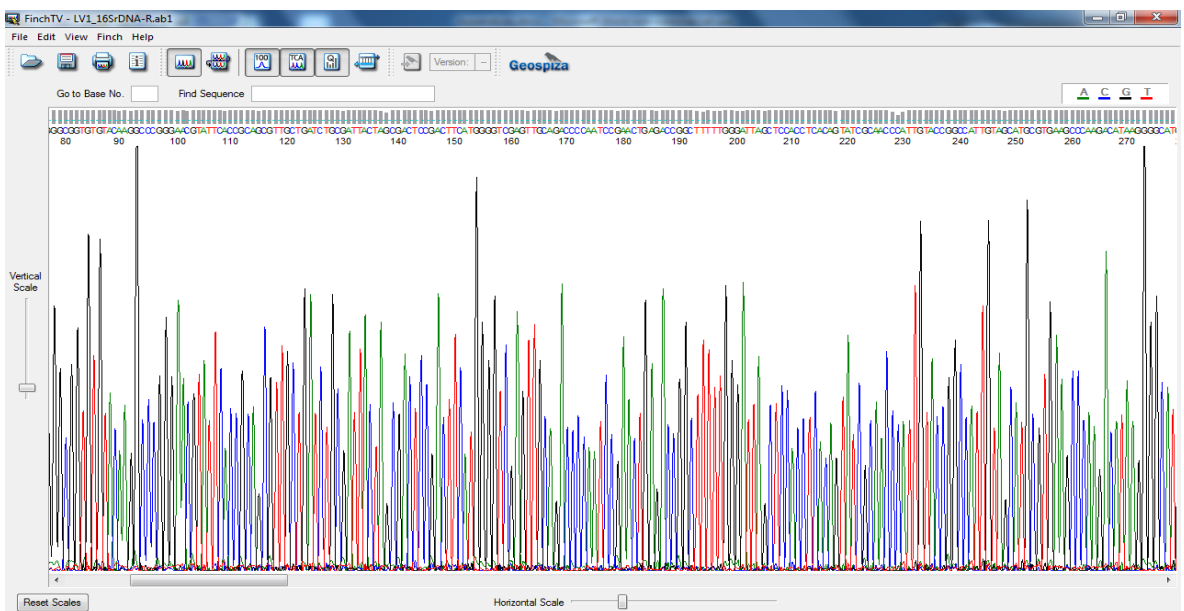


**Figure A12.** Schematic illustration of structure plasmid pCR 2.1 TOPO (3.9 kb) used as cloning vector. Vector data for pCR 2.1 indicating the ligation site for the TA cloning system and the available restriction sites. Information extracted from the Invitrogen TA cloning kit manual.

## Example of 16S rDNA Foreword Sequences Applied in FinchTV Program



## Example of 16S rDNA Reverse Sequences Applied in FinchTV Program

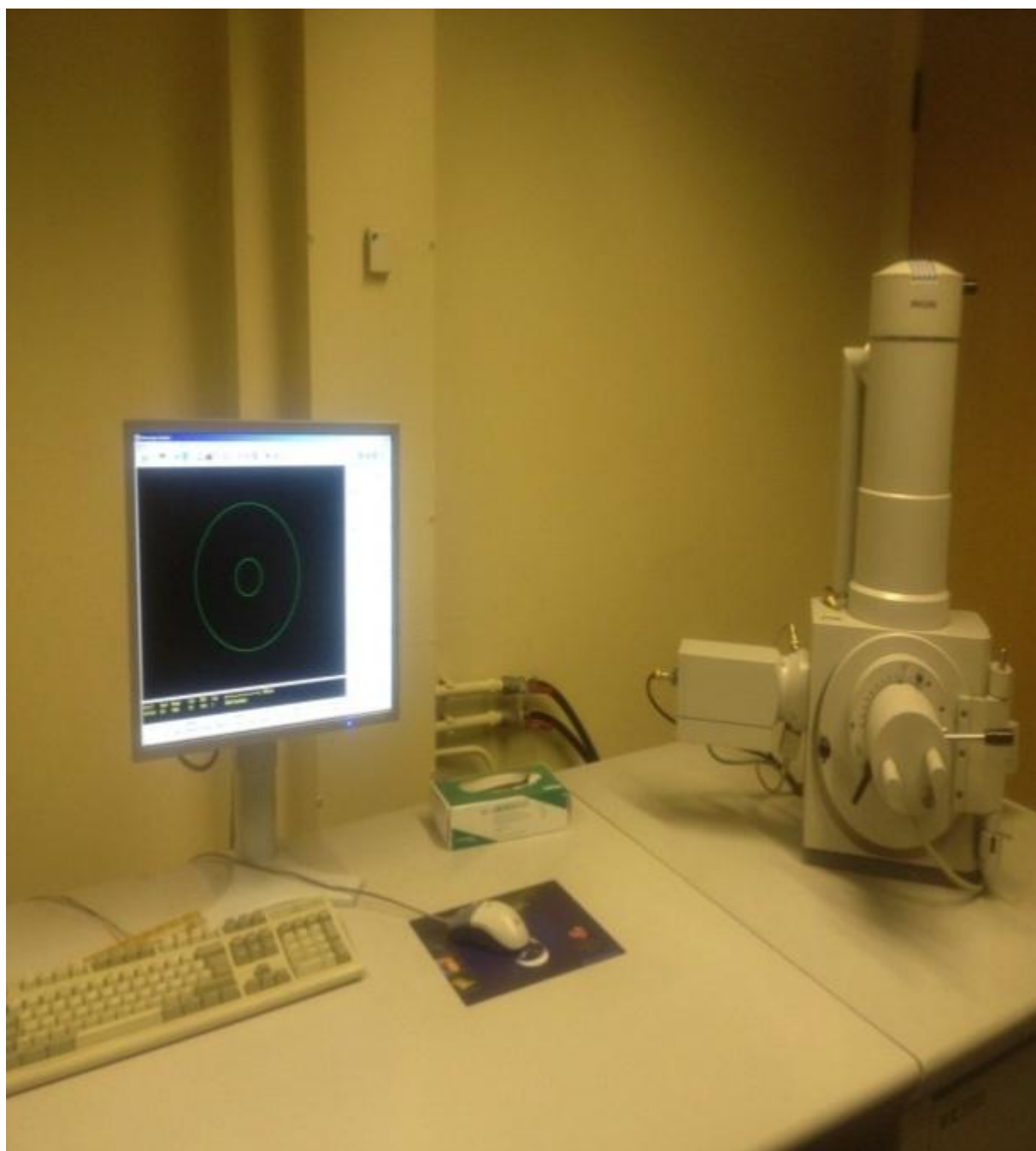


**Figure A13.** These two examples were taken from (Almalki, 2012).



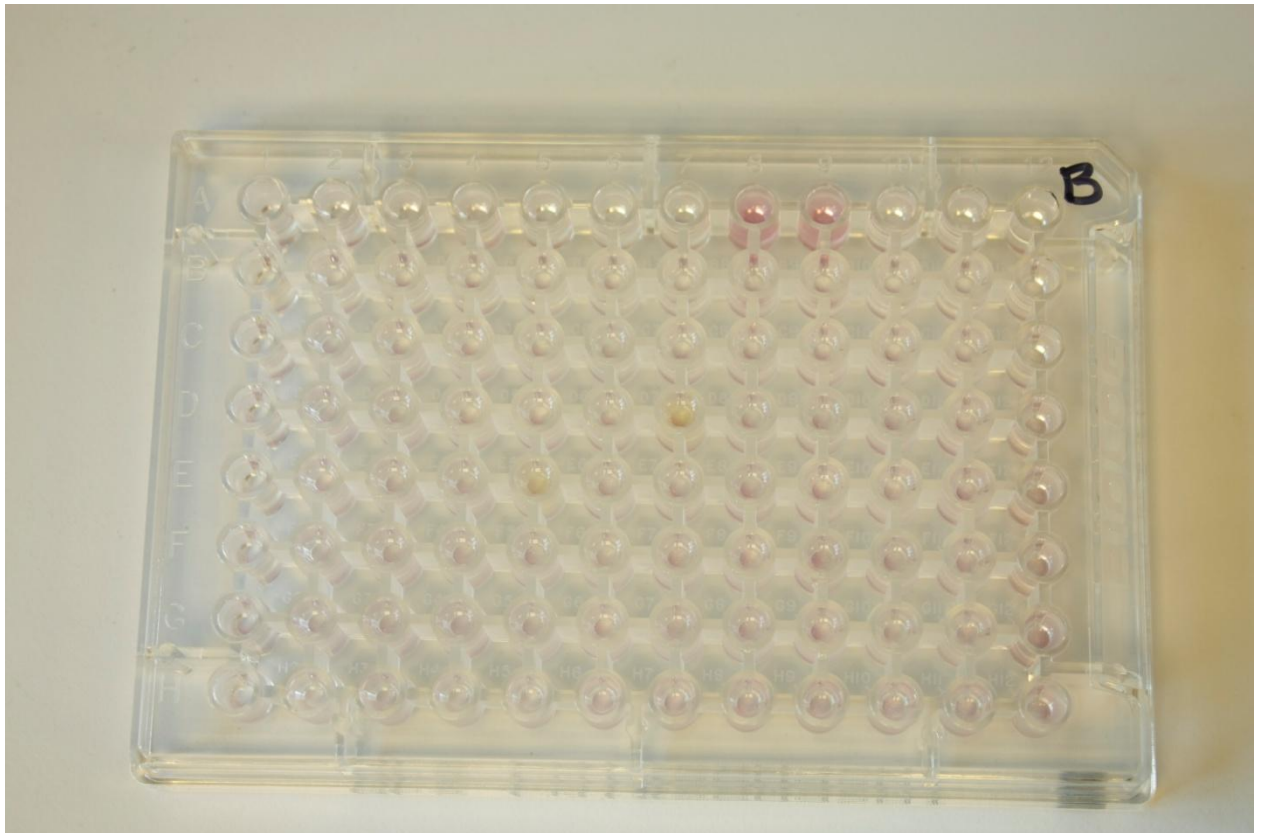
## Electron Microscope Facility:

SEM

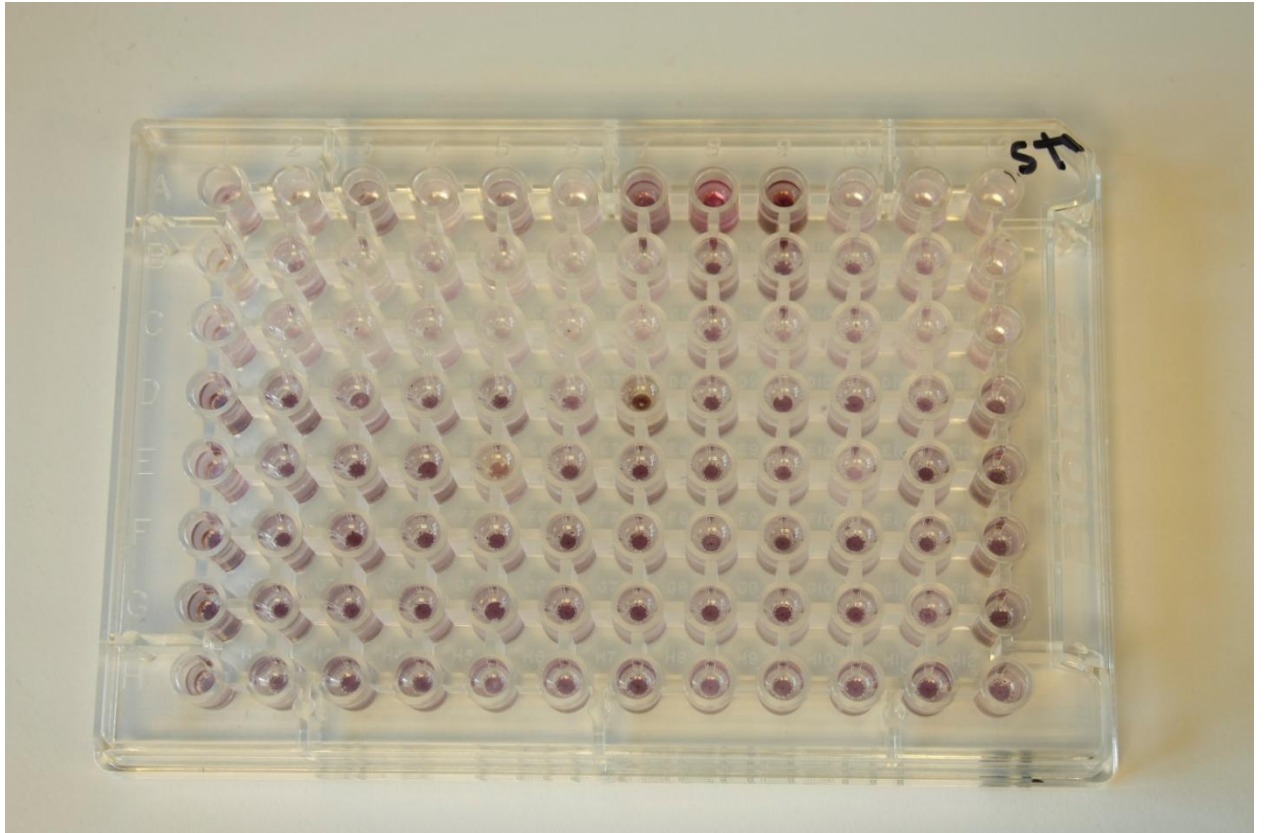


TEM



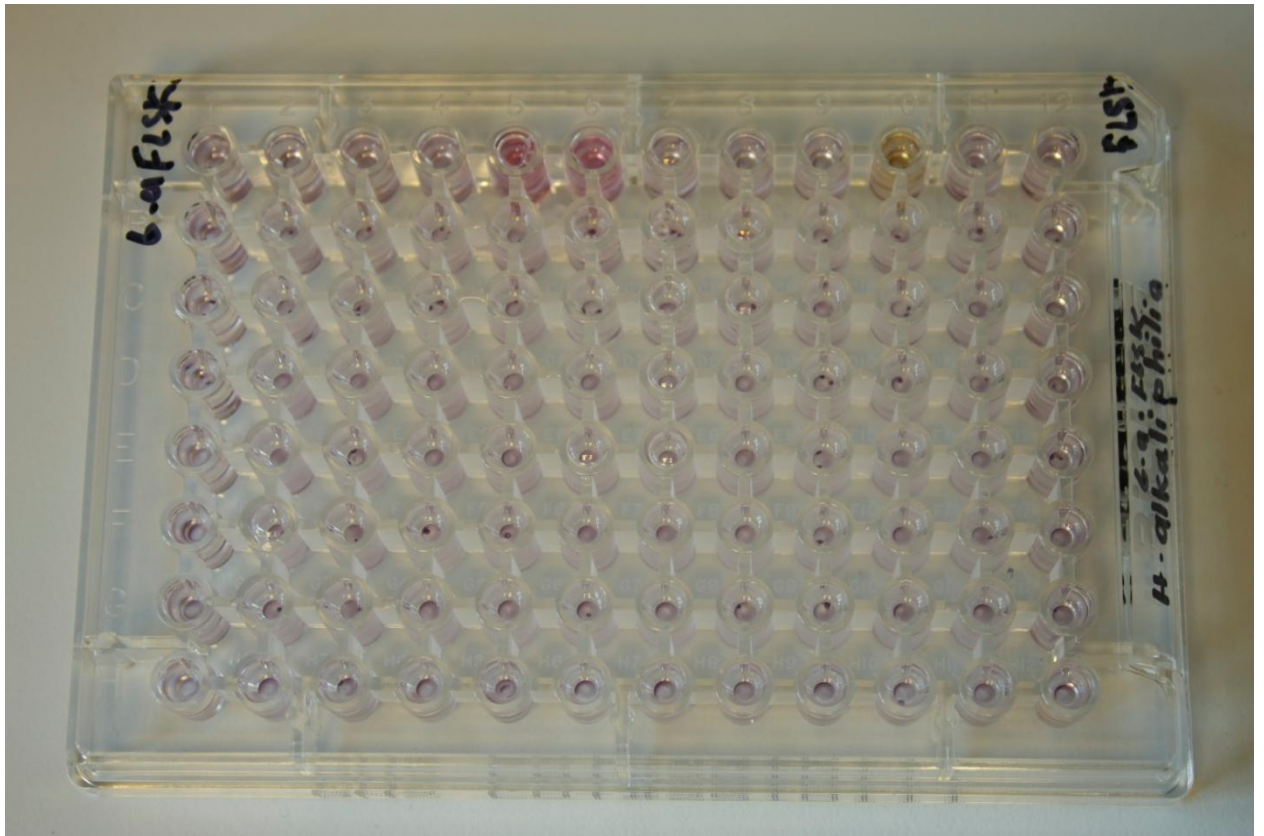


**Figure A14.** *Exiguobacterium* ABr1 Biolog Reaction Test Result.

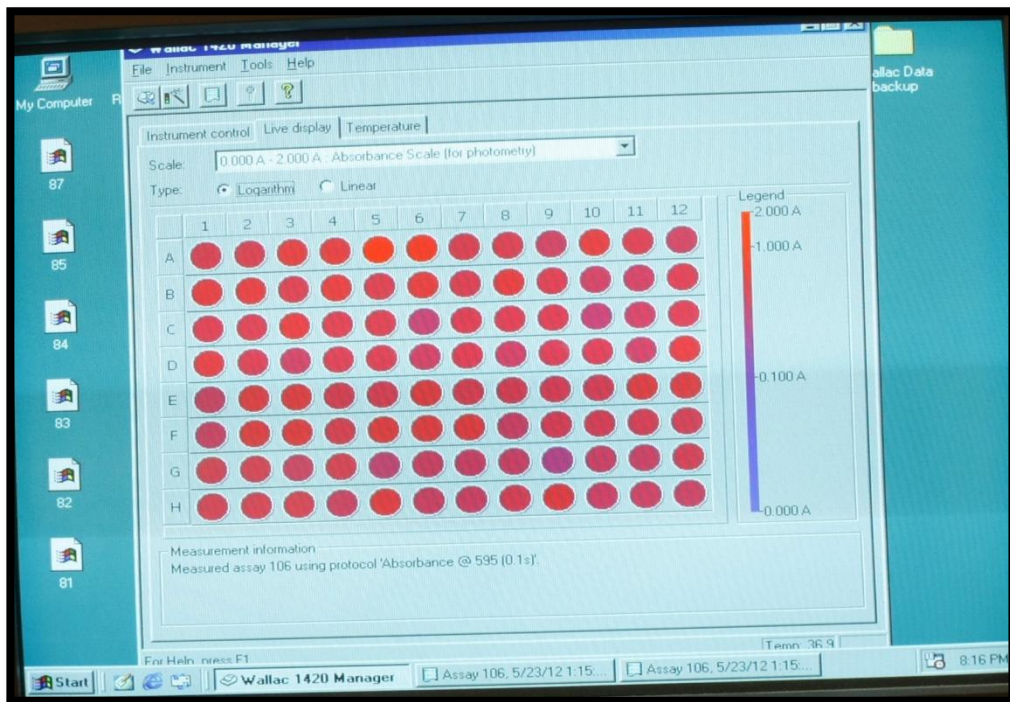
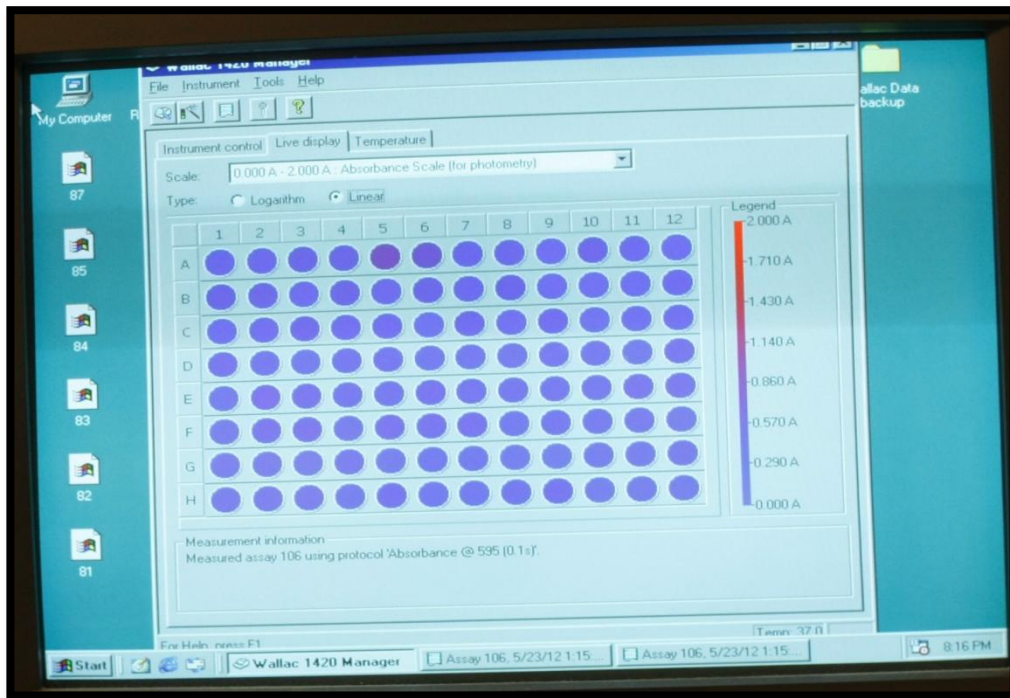


**Figure A15.** *Staphylococcus warneri* 4.C FLTR, Biolog Reaction Test Result.

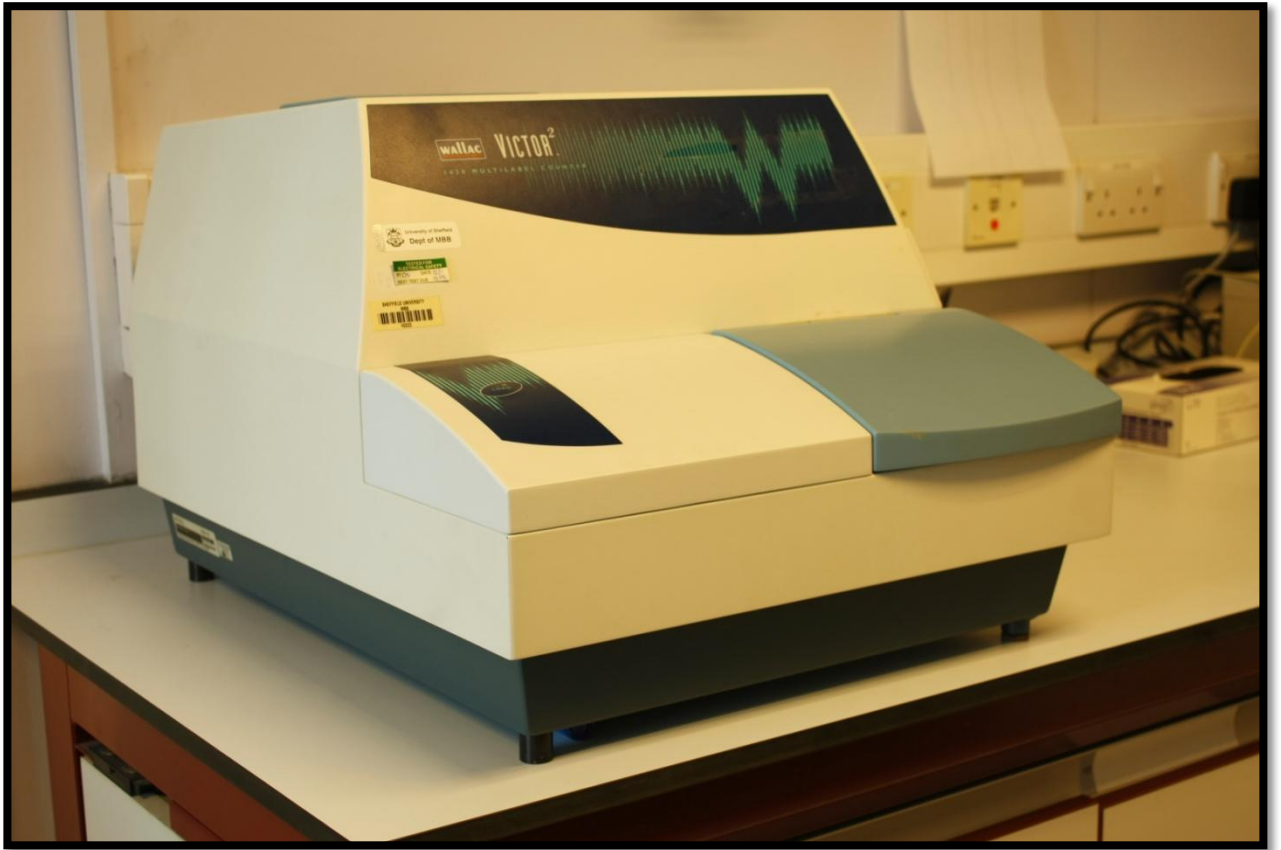




**Figure A16.** Biolog Reaction Test Result of *Halomonas alkaliphilia* 6.a FLSK



**Figure A17.** Biolog Reaction steps displayed on the screen.



**Figure A18.** Plate Reader of Biolog Test Samples.

# Manufacturer Information on UV lamps

## EL Series Ultraviolet Hand Lamps User's Guide

---

### Introduction

The EL Series of Ultraviolet Lamps offer a uniform and intense source of ultraviolet light (radiation). The lamps emit one of three UV wavelengths or white light in four watt, six watt and eight watt configurations for exposure/illumination of materials. All EL Series Lamp models can be used with the universal J138 Lamp Stand. The four watt models can be used with C-10E Cabinet for viewing materials in a darkroom environment. Eight watt lamps can be used with the C-65 Cabinet.

### Important Safety Information

Caution: Shortwave and midrange UV radiation will cause damage to unprotected eyes and skin. Before operating any unit, be sure all personnel in the area are properly protected. UV Blocking Eyewear should be worn as well. UVP has a complete line of UV Blocking Eyewear: Spectacles, Goggles and Faceshield designed for this purpose.

### Operation

Plug power cord into a properly grounded electrical outlet. The proper voltage of the lamp is found on the product information label.

A rocker switch is conveniently located on top of the unit to turn the lamp on or off. For models with multiple wavelengths, the rocker switch accommodates for the selection of wavelength or to shut the unit off.

Each lamp comes with two UV tubes or one UV and one white light tubes; the UVLSM-38 is equipped with three tubes. Models with two tubes of the same wavelength operate with both tubes on at same time. Other models operate with only a single tube at one time.

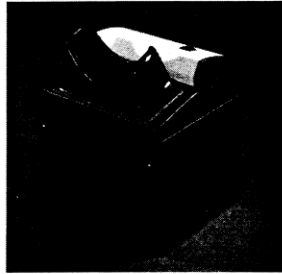
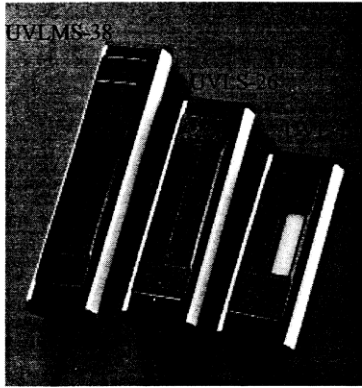
### Specifications

Physical dimensions for four, six and eight watt lamps:

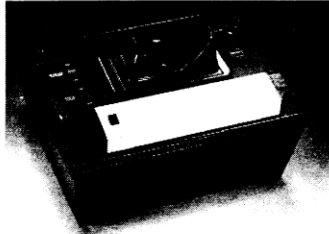
Four watt lamps:	9.8"L x 2.5"H x 3.8"W (249 x 64 x 97 mm)
Six watt lamps:	11.9"L x 2.5"H x 3.8"W (302 x 64 x 97 mm)
Eight watt lamps:	14.9"L x 2.5"H x 3.8"W (376 x 64 x 97 mm)



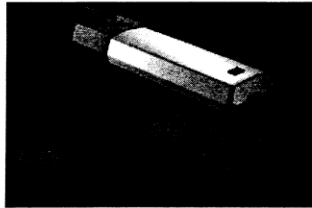




C-10E Cabinet with four watt lamp



C-65 Cabinet with eight watt lamp



Universal stand for all EL Series Lamps

#### Four Watt Lamp Specifications

Model	Wavelength	Part Number	Nominal Volts/Hz/Amp
UVS-14	254nm/White Light	95-0266-01	115/60/0.16
		95-0266-02	230/50/0.16
		95-0266-03	100/50-60/0.16
UVL-14	365nm/White Light	95-0264-01	115/60/0.16
		95-0264-02	230/50/0.16
		95-0264-03	100/50-60/0.16
UVS-24	254nm	95-0269-01	115/60/0.32
		95-0269-02	230/50/0.32
		95-0269-03	100/50-60/0.32
UVL-24	365nm	95-0267-01	115/60/0.32
		95-0267-02	230/50/0.32
		95-0267-03	100/50-60/0.32
UVLS-24	365nm/254nm	95-0271-01	115/60/0.16
		95-0271-02	230/50/0.16
		95-0271-03	100/50-60/0.16

#### Six Watt Lamp Specifications

Model	Wavelength	Part Number	Nominal Volts/Hz/Amp
UVS-16	254nm/White Light	95-0274-01	115/60/0.16
		95-0274-02	230/50/0.16
		95-0274-03	100/50-60/0.16
UVL-16	365nm/White Light	95-0272-01	115/60/0.16
		95-0272-02	230/50/0.16
		95-0272-03	100/50-60/0.16
UVM-16	302nm/White Light	95-0273-01	115/60/0.16
		95-0273-02	230/50/0.16
		95-0273-03	100/50-60/0.16
UVS-26	254nm	95-0277-01	115/60/0.32
		95-0277-02	230/50/0.32
		95-0277-03	100/50-60/0.32
UVL-26	365nm	95-0275-01	115/60/0.32
		95-0275-02	230/50/0.32
		95-0275-03	100/50-60/0.32
UVM-26	302nm	95-0276-01	115/60/0.32
		95-0276-02	230/50/0.32
		95-0276-03	100/50-60/0.32
UVLS-26	365nm/254nm	95-0279-01	115/60/0.16
		95-0279-02	230/50/0.16
		95-0279-03	100/50-60/0.16
UVLM-26	365nm/302nm	95-0278-01	115/60/0.16
		95-0278-02	230/50/0.16
		95-0278-03	100/50-60/0.16

### Eight Watt Lamp Specifications

Model	Wavelength	Part Number	Nominal Volts/Hz/Amp
UVS-18	254nm/White Light	95-0200-01	115/60/0.16
		95-0200-02	230/50/0.16
		95-0200-03	100/50-60/0.16
UVL-18	365nm/White Light	95-0198-01	115/60/0.16
		95-0198-02	230/50/0.16
		95-0198-03	100/50-60/0.16
UVM-18	302nm/White Light	95-0199-01	115/60/0.16
		95-0199-02	230/50/0.16
		95-0199-03	100/50-60/0.16
UVS-28	254nm	95-0249-01	115/60/0.32
		95-0249-02	230/50/0.32
		95-0249-03	100/50-60/0.32
UVL-28	365nm	95-0248-01	115/60/0.32
		95-0248-02	230/50/0.32
		95-0248-03	100/50-60/0.32
UVM-28	302nm	95-0250-01	115/60/0.32
		95-0250-02	230/50/0.32
		95-0250-03	100/50-60/0.32
UVLS-28	365nm/254nm	95-0201-01	115/60/0.16
		95-0201-02	230/50/0.16
		95-0201-03	100/50-60/0.16
UVLM-28	365nm/302nm	95-0251-01	115/60/0.16
		95-0251-02	230/50/0.16
		95-0251-03	100/50-60/0.16
UVLMS-38	365/302/254nm	95-0252-01	115/60/0.16
		95-0252-02	230/50/0.16
		95-0252-03	100/50-60/0.16

### Replacement Tubes and Switches

Replacement Part	Part Number
Switch, On/Off	53-0134-01
Switch, On/Off/On	53-0135-01
Tube, 4 watt, 365nm	34-0005-01
Tube, 4 watt, 254nm	34-0066-01
Tube, 4 watt, white light	34-0003-01
Tube, 6 watt, 365nm	34-0034-01
Tube, 6 watt, 302nm	34-0044-01
Tube, 6 watt, 254nm	34-0015-01
Tube, 6 watt, white light	34-0063-01
Tube, 8 watt, 365nm	34-0006-01
Tube, 8 watt, 302nm	34-0042-01
Tube, 8 watt, 254nm	34-0007-01
Tube, 8 watt, white light	34-0056-01

### Accessories

Accessories	Part Number
J138 Lamp Stand	18-0063-01
C-65 Cabinet	95-0257-01
C-10E Cabinet	95-0072-08
Spectacles	98-0002-01
Goggles	98-0002-02
Faceshield	98-0002-04

### Changing the Replacement Tubes

Always disconnect the lamp from the electrical power source prior to replacing tubes. Remove the two Phillips Head Screws located in the End Cap. Grasp the extruded housing and slide the chassis and filter out together away from the switch. Disconnect the interior Molex Connector (see Figure 1) and slide chassis and filter out of the housing completely. Once out of the extrusion, the chassis and filter will come apart. Carefully grasp the tube ends and twist one quarter turn until it works free (see Figure 2). Insert the new tube, giving it a twist to lock in place. Reassemble the lamp. Be careful not to pinch wires during assembly.

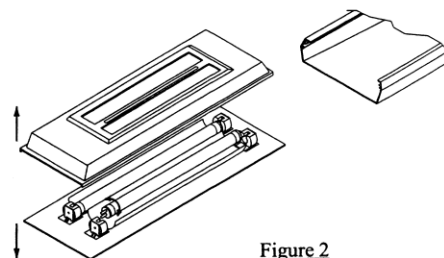
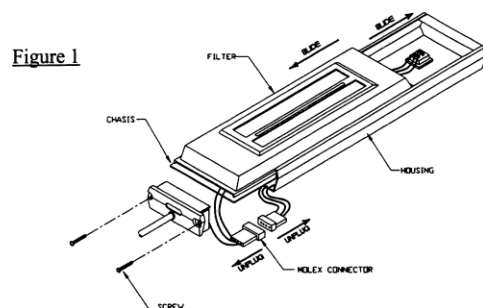


Figure 2

### **Cleaning the EL Series Lamps**

The painted surfaces and filter areas of the lamp should be cleaned with a damp sponge or cloth towel and mild soap. Never use abrasive cleaners, solvent based cleaners or scouring pads.

ALWAYS DISCONNECT THE LAMP FROM THE ELECTRICAL POWER PRIOR TO CLEANING.

### **Maintenance/Repair/Technical Assistance**

UVP offers technical support for all of its products. If you have any questions about the product's use, operation or repair, call or fax UVP Customer Service at the following offices:

In the US: Tel: (909)946-3197 or toll free (800)452-6788; Fax: (909)946-3597; E-Mail [uvp@uvp.com](mailto:uvp@uvp.com)  
Europe/UK: Tel: +44(0)1223-420022; Fax: +44(0)1223-420561; E-Mail: [uvp@dial.pipex.com](mailto:uvp@dial.pipex.com)

A **Returned Goods Authorization (RGA)** number must be obtained from UVP Customer Service before returning any products.

### **Warranty**

UVP, Inc. warrants its EL Series Lamps to be free of defects in materials and workmanship for a period of one (1) year from the date of purchase. Tubes and filters are warranted for a period of 90 days. If equipment failure or malfunction occurs during the warranty period, UVP shall examine the inoperative equipment and have the option of repairing or replacing any part(s) which, in the judgement of UVP, were originally defective or became so under conditions of normal usage and service.

No warranty shall apply to this instrument, or part thereof, that has been subject to accident, negligence, alteration, abuse or misuse by the end user. Moreover, UVP makes no warranties whatsoever with respect to parts not supplied by UVP or that have been installed, used and/or serviced other than in strict compliance with the instruments appearing in this manual.

In no event shall UVP be responsible to the end user for any incidental or consequential damages, whether foreseeable or not, including but not limited to property damage, inability to use equipment, lost business, lost profits, or inconvenience arising out of or connected with the use of instruments produced by UVP. Nor is UVP liable or responsible for any personal injuries occurring as a result of the use, installation and/or servicing of equipment.

This warranty does not supersede any statutory rights that may be available in certain countries.



Internet: <http://www.uvp.com>

**Corporate Headquarters: UVP, Inc.**  
2066 W. 11th Street, Upland, CA 91786 USA  
Tel: (909)946-3197 or toll free in US/Canada (800)452-6788  
Fax: (909)946-3597 E-Mail: [uvp@uvp.com](mailto:uvp@uvp.com)

**European Operations: Ultra-Violet Products Limited**  
Unit 1, Trinity hall Farm Estate, Nuffield Road, Cambridge CB4 1TG UK  
Tel: +44(0)1223-420022 Fax: +44(0)1223-420561  
E-mail: [uvpuk@uvp.com](mailto:uvpuk@uvp.com)

81-0117-01 Rev. A