

Report On The

# Pool Prodigy Water Purification System

Formerly Know as KrystalKlor Technology Water Purification System



**Report Completed By:  
Henry Richards, President  
Consulting Engineering, Inc**

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## Consultant Credentials

Henry Richards, President  
Consulting Engineering, Inc.

Mr. Richards completed his undergraduate and master's program at Arizona State University and was pursuing his doctorate with a dissertation entitled "A Challenge to the Betz Constant" when he was offered a senior position at National Radio Astronomy's VLA program,

He provided technical expertise to the X-7 program, a Mach3+ test vehicle, spent 10 years in a variety of technical positions on the Deep Space and Apollo programs, He spent 10 years in the scientific and academic communities as a professor and working in Astrophysics, Over the years he has spent considerable time researching and gathering data, writing scientific reports and papers and giving numerous technical lectures in the USA and Europe. For the past 18 years Mr. Richards has been Vice President of Research and Development for an aerospace company, and is now a consultant to that company.

## Safely of the Water of the Purification System [Pool Prodigy]

All chemicals and materials used in the Purification System [Pool Prodigy] are inorganic; therefore, samples of water from nineteen pools were taken and analyzed for the following inorganic materials and compared with the allowable inorganic material in drinking water as defined by the State of Arizona. Each pool selected has been in full operation for at least two seasons.

Although unrelated to the Purification System [Pool Prodigy], several organic impurities were also tested and are included in the accompanying report.

Consulting Engineering, Inc, is in the business of having tests performed and reporting the test results. We are not toxicologists or medical doctors, however we do state that the water tested is typical of any well filtered pool and far exceeds the safety requirements for swimming.

The water was tested for the following agents:

1. Chlorine, Total
2. Fluoride
3. Nitrate + Nitrite - N
4. Nitrite - N
5. Antimony, Total
6. Arsenic, Total
7. Barium, Total
8. Beryllium, Total
9. Boron, Total
10. Cadmium, Total
11. Chromium, Total
12. Lead, Total
13. Manganese, Total
14. Mercury, Total
15. Nickel, Total
16. Selenium, Total
17. Silver, Total
18. Thallium, Total
19. Zinc, Total
20. Ecolab
21. Fecal Coliform - MPN
22. Mold/Fungi Count
23. Plate Count (Standard)
24. Yeast 1 Mold Count

## **Safety of the Purification System [Pool Prodigy]**

The Purification System [Pool Prodigy] produces chlorine, balances the pH level and the Alkalinity of the water.

Concentrated chlorine and acid are both toxic and dangerous. There is no risk of exposure to these chemicals from operation of the Purification System [Pool Prodigy]. The system would have to be destroyed by a major impact; such as a car crashing into it, to potentially pose any type of chemical exposure hazard.

This must be compared to the danger of a pool owner's exposure to high levels of chlorine and acid through the manual method. Opportunities for exposure start with the procurement of the chemicals and are viable threats during the transportation, storage, and handling as they are added to the pool. The Purification System [Pool Prodigy] eliminates all of these dangers.

There are two secondary dangers when chemicals are manually added to a swimming pool.

- 1) Until the chemicals are properly dispersed through the water, chemical concentrations in the area of the water they were added are in excess of the safe limits.
- 2) There is always the inherent danger of adding excessive amounts of chemicals to the water.

Water from the Purification System [Pool Prodigy] meets and exceeds all safety requirements as it enters the pool so there is never an unsafe concentration of chlorine- or acid.

## Effectiveness of the Purification System [Pool Prodigy]

*pH, CL and alkalinity readings were recorded after initial Installation and numerous times throughout the development phase.*

Below is a list of pools that have been in operation for over two seasons using the Purification System [Pool Prodigy] with initial readings and approximately one year after installation, All pools are periodically tested and all remain within the desired range

Location	Construction	Size	After Installation			One Year After Install			Power Consumption In VI
			pH	Cl	Alk	pH	Cl	Alk	
Mesa	Pebble	12,000	7.5	3.0	75	7.5	3.2	130	50.7
Mesa	Fiberglass	23,000	7.7	4.0	190	7.5	2.5	125	42.6
Fountain Hills	Plaster	23,000	7.4	2.5	140	7.5	2.0	130	45.9
Mesa	Fiberglass	18,000	7.5	2.5	130	7.3	2.0	160	34.4
Scottsdale	Plaster	23,000	7.7	2.0	140	7.4	2.0	123	42.6
Mesa	Plaster	10,000	7.5	2.5	140	7.5	2.5	130	33.6
Peoria	Plaster	15,000	7.5	2.5	130	7.4	2.0	120	39.2
Tampa	Fiberglass	27,000	7.6	2.5	150	7.2	2.0	125	32.0
Phoenix	Pebble	12,000	7.5	3.0	130	7.6	3.0	130	38.5
Mesa	Pebble	15,000	7.5	2.0	120	7.7	2.0	120	39.5
<b>Phoenix</b>	Pebble	15,000	7.5	3.0	120	7.5	3.0	120	39.9
Phoenix	Fiberglass	30,000	7.7	3.0	160	7.4	2.5	130	28.0
Scottsdale	Fiberglass	30,000	7.8	3.0	130	7.6	2.0	120	46.0
<b>Phoenix</b>	Pebble	20,000	7.8	2.0	140	7.8	2.0	140	33.8
Scottsdale	Pebble	20,000	7.5	2.0	150	7.5	2.0	130	21.7
Scottsdale	Fiberglass	20,000	7.8	2.0	140	7.4	2.0	120	44.5
Scottsdale	<b>Plaster</b>	25,000	7.5	2.0	130	7.4	1.5	100	26.5
Tempe	Plaster	24,000	7.4	2.0	130	7.4	2.0	100	17.0
Phoenix	Plaster	18,000	7.5	2.0	120	7.4	2.0	110	19.2

Henry Richards President  
Consulting Engineering, Inc.

## Unsigned Information

*The following information is included but is not part of the signed report. It was gathered from notes given by Ryan James, from advertising literature, and from my own observations.*

The principal advantages of this system are:

#	Advantage	Comments
1	Economy	*There is no need to purchase chemicals.
2	Convenience	*There is no need to chemically service the pool.
3	Safety	*There is no need to transport, store or handle dangerous chemicals.
4	Beauty	The water is very clear. There is no erosion from the freshwater equipment used in pools, no etching from salty water, no calcium buildup on the tile, and no algae buildup
5	Environment	There are no harmful by-products or odors.

**\*Except for the need to add a stabilizer approximately once a year for UV protection**

### Features

1. Holds alkalinity from 110ppm to 150ppm.
2. Holds pH between 7.2 and 7.8
3. Holds chlorine between 1.5 and 4.0.
4. There are no moving parts to wear out.
5. Customized during installation based on- pool size, construction of pool, and temperature zone the pool is located in.

### Design Development and Miscellaneous Details

1. No field testing was performed in the years 2000 and 2001
2. Field testing was performed in 2002 and 2003
3. 100+ units are in the field
4. 30 units were tested in the field during the summers of 2002 and during the record breaking heat of 2003
5. 110 and 220 volt options are available
6. A commercial version is available.
7. Development took place on 3M, plaster, Pebble, and fiberglass pools
- 8 Alkalinity can be adjusted from temperatures of up to 120 degrees
9. One annual adjustment is recommended during the normal annual servicing
10. In general the runtime for the purifier in hours is the size of the pool in gallons divided by 1,700- the run time for a 10,200 gallon pool will be 6 hours



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## LABORATORY REPORT

Client: Consulting Engineering, Inc.  
6209 W. Boston Way N.  
Chandler, AZ 85226

Date Submitted: 1/13/04

Date Reported: 02/19/04

Attn: Henry Richards  
Date Reported: 02119/04

### RESULTS

Client 10: Pool Composite

Sample Type: Aqueous

ACT Lab No.: BL00351

Sample Time: 01/11/04 00:00

Analysis Date					
Parameter	Start	End	Method No.	Result	Unit
Chlorine, Total	1/14/04	1/14/04	330.4	0.02	mg/L
Fluoride	1/22/04	1/22/04	SM4500F C	1	mg/L
Nitrate + Nitrite + N	1/22/04	1/22/04	SM4500N03 E	3.73	mg/L as N
Nitrite + N	1/13/04	1/13/04	SM4500N02 B	<0.01	mg/L as N
Antimony, Total	1/21/04	1/21/04	200.9	<0.002	mg/L
Arsenic, Total	1/16/04	1/16/04	200.9	0.005	mg/L
Barium, Total	1/16/04	1/16/04	200.7/6010B	0.02	mg/L
Beryllium, Total	1/16/04	1/16/04	200.7/6010B	<0.002	mg/L
Boron, Total	1/16/04	1/16/04	200.7/6010B	1.37	mg/L
Cadmium, Total	1/16/04	1/16/04	200.7/6010B	<0.002	mg/L
Chromium, Total	1/16/04	1/16/04	200.7/6010B	0.02	mg/L
Lead, Total	1/22/04	1/22/04	200.9	<0.002	mg/L
Manganese, Total	1/16/04	1/16/04	200.7	<0.01	mg/L
Mercury, Total	1/23/04	1/23/04	245.1/7470A	<0.0005	mg/L
Nickel, Total	1/16/04	1/16/04	200.7/8010B	<0.01	mg/L
Selenium, Total	1/23/04	1/23/04	200.9	<0.002	mg/L
Silver, Total	1/26/04	1/26/04	200.9	<0.002	mg/L
Thallium, Total	2/2/04	2/2/04	279.2	<0.002	mg/L
Zinc, Total	1/16/04	1/16/04	200.7/8010B	<0.01	mg/L
e. Coli	1/13/04	1/15/04	SM9221 F	<2	MPN/100 mL
Fecal coliform	1/13/04	1/15/04	SM9221 E	<2	MPN/100 mL
Mold/Fungi Count	1/13/04	1/20/04	SM9610 D (m)	3	cfu/100 mL
Plate Count (standard)	1/13/04	1/15/04	SM9215B	<1	cfu/mL
Yeast/Mold Count	1/13/04	1/20/04	SM9610 D (m)	3	cfu/100 mL

Reviewed by:

Frederick A. Amalfi, Phi Laboratory Director