

# Indoor Naturpool



Designed  
and built  
by the  
company  
Zebra  
Garten +  
Pool





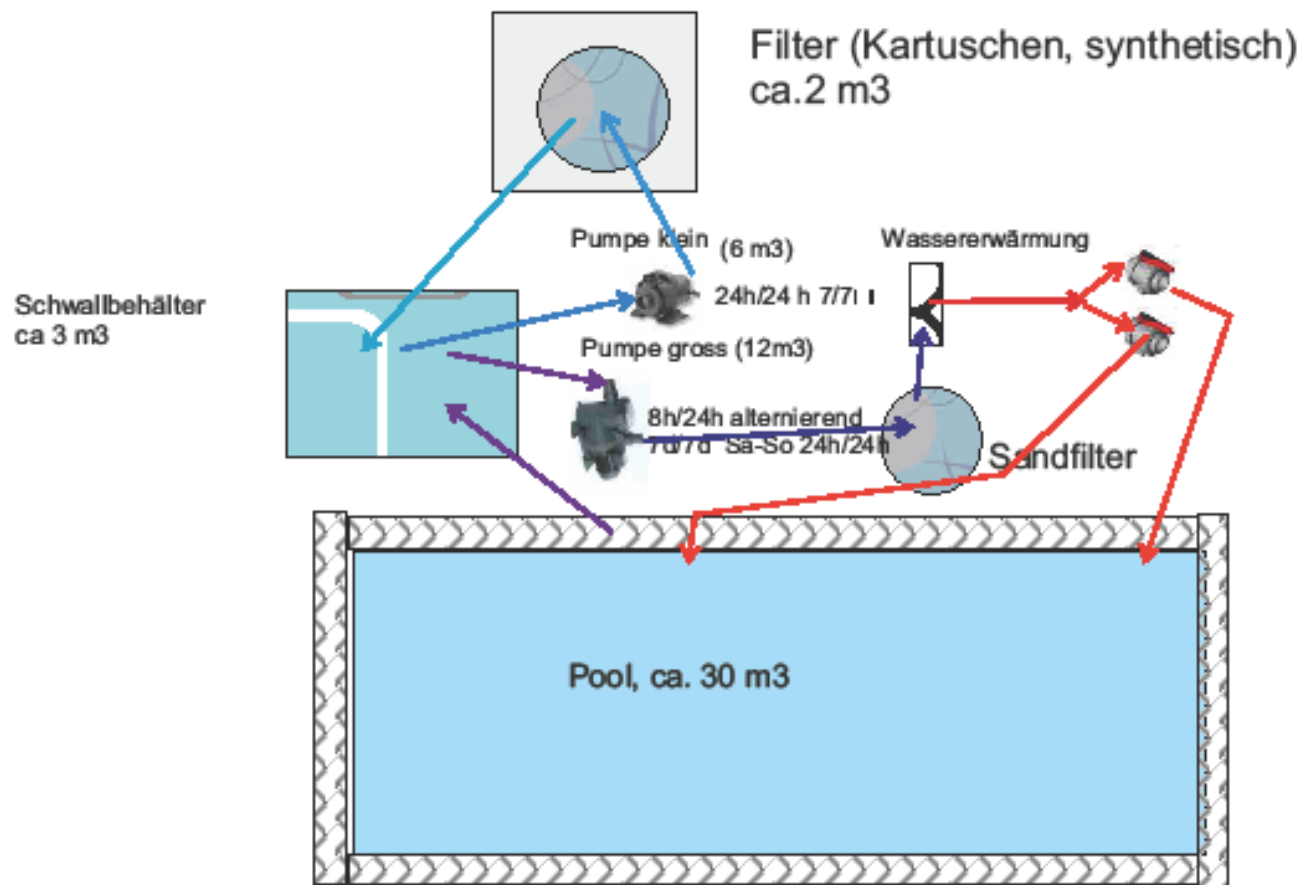
## Indoor Naturpool

Construction: 2010 Size: 7.00 x 3.00 m Bathing depth: 1.30  
Volume: approx. 30 m<sup>3</sup> Sealing: chrome steel  
Water treatment: Synthetic pressure filter, sand filter  
Water temperature: 25-28 °C

An originally installed plant filter has not proven itself and was removed again  
Use intensity: Married couple, approx 3-4 times / week



# Fliessschema Marinovic



Wasseranalyse für Marinovic 1.10.21

	Füllwasser vor Osmose	Teichwasser
	Wert	optimaler Wert
Leitfähigkeit [ $\mu\text{S}/\text{cm}$ ]	911,00	100-2000 1535
Redoxpotential [mV]		>200
pH-Wert	7,10	6.5 - 9.0 7,96
Kalzium [mg/L]	<100 (ca 300)	10-120 51
Natrium [mg/L]		bis 60
Magnesium [mg/L]		
Nitrat [mg/L]		2,30 bis 10 11,6
Nitrit [mg/L]		bis 0.5
Ammonium [mg/L]		bis 1
Ptot [mg/L]		
Ortho-P [ $\mu\text{g}/\text{L}$ ] als Phosphat		170,00 P bis 30/PO4 <120 1050
Organ. P [ $\mu\text{g}/\text{L}$ ]		
Gesamthärte [ $^{\circ}\text{dH}$ ]	<20	bis 20



Given these values, the question arises as to how this pool can function. Answer: you don't know, is there an unknown limiting element somewhere?



After initial difficulties, due to an unsuitable filter, high sulfur content in the water, non-functioning plant filter, insufficient pump output  
The pool has been working properly for many years now.





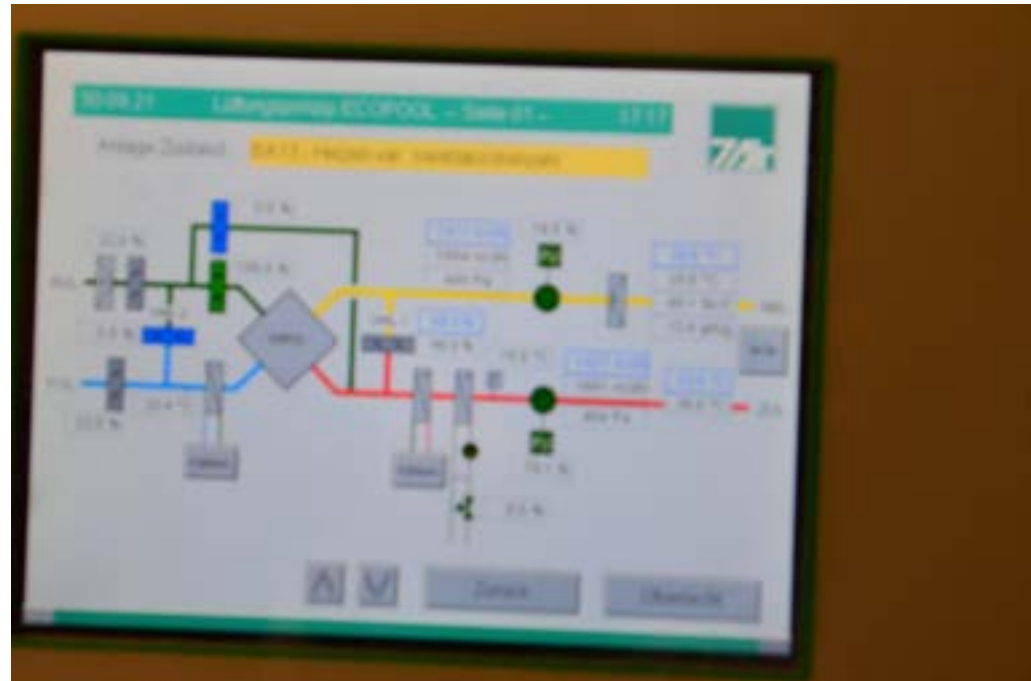
# Wassertreatment

The filling water, which contains a lot of lime and sulfur, is treated in a powerful reverse osmosis system.



## Prefilter and waterheating

A pressure sand filter is used to pre-clean the water. The water is heated via the two heat exchangers. The energy for this is supplied by the air conditioning system, which essentially extracts heat from the water from the exhaust air by means of a heat pump.

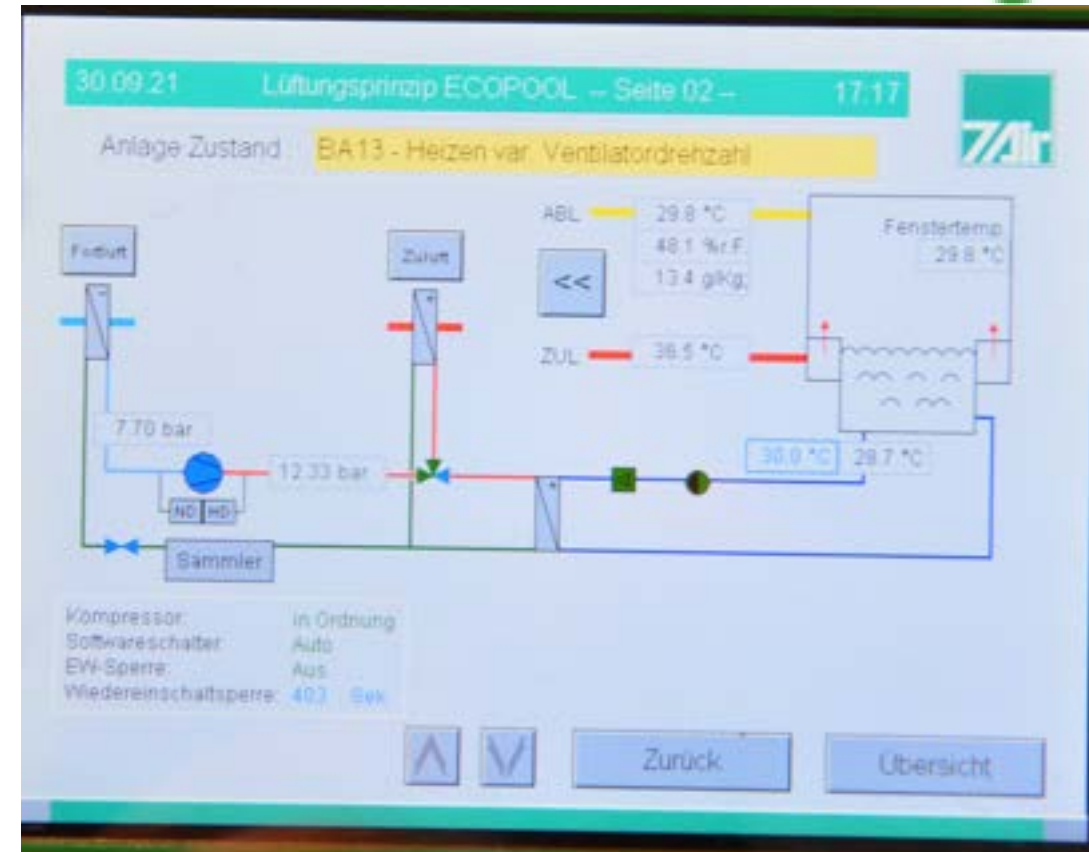


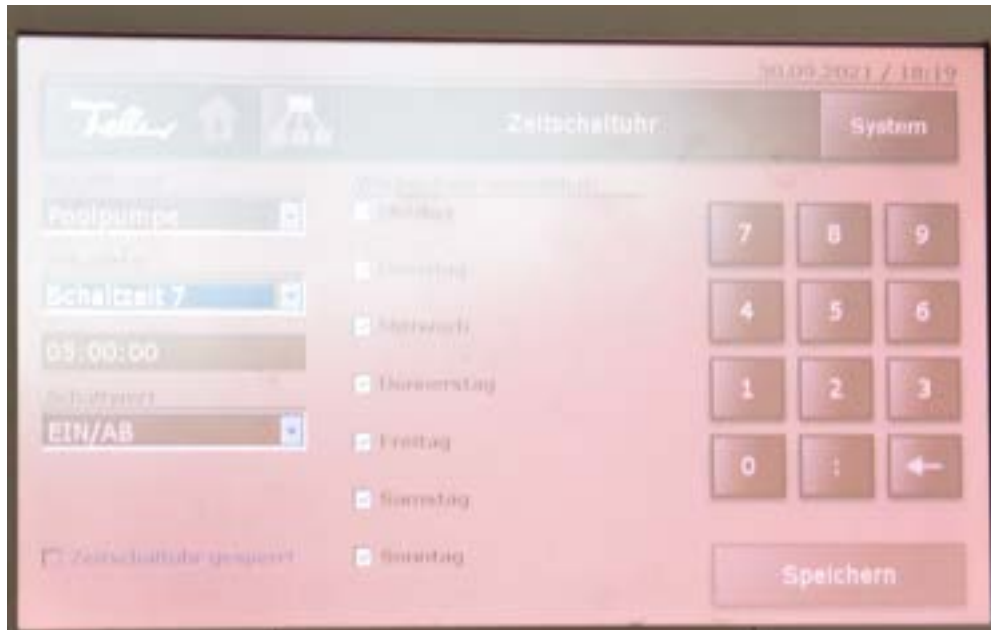
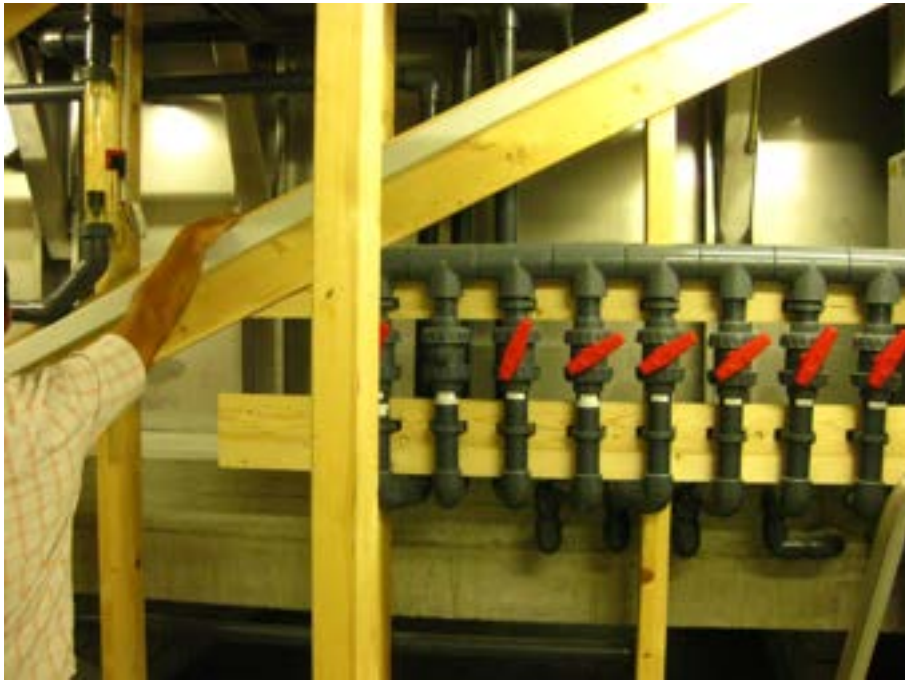


# Ventilation



A central point in the indoor pool is ventilation. It is essential to consult experts here. In this project, the temperature difference between water and air temperature was defined as an important criterion. The air temperature must always be 1 degree higher than the water temp..





# Semi-Indoor-Pool



Converted to bio pool:  
Graf Gartenbau + Schwimmteich GmbH

- Swimming school for toddlers
- Operating times: Early April - end of October

Example of an inexpensive variant



# Semi-Indoor-Pool



Size: 10.0 x 5.0x  
1.50 Use intensity:  
6/7, 15-20 people  
Water treatment:  
Gravel filter 1:90  
Water heating: Air  
heat pump  
Conversion in  
BioPool: 2019  
Problems: slight  
biofilm on the stairs  
Solution: increase  
flow



# Semi-Indoor-Pool





# Semi-Indoor-Pool



Graf Gartenbau + Schwimmteich GmbH  
Krauchthalstrasse 6  
CH-3065 Bolligen  
Tel. 0041(0)31 921 00 97  
Fax 0041(0)31 921 45 83  
hansgraf@bluewin.ch  
www.graf-gartenbau.ch  
Mwst. CHE-226.577.816

Envie Nature - Mme. Catherine Modoux - Rte de Gillarens 19 - 1673 Promasens

**Baignade Naturelle - Schéma pour le filtre**

Bolligen, 22. August 2018, mat = 1:100





Prüfbericht ULS19-004604-1  
Lyss, den 02.07.2019

Übersicht	
Probe Nr.	19-104397-01
Eingangsdatum	27.06.2019
Bezeichnung	Modoux (Badeteich)
Probenart	Badewasser
Probenahme	27.06.2019
Entnahmezeit	10:00
Eingangszeit	14:50
Probenahme durch	Graf Gartenbau + Schwimmteich GmbH
Entnahmetemperatur	28,0 °C
Eingangstemperatur	31,7 °C
Untersuchungsbeginn	27.06.2019
Untersuchungsende	02.07.2019

#### Mikrobiologische Untersuchung

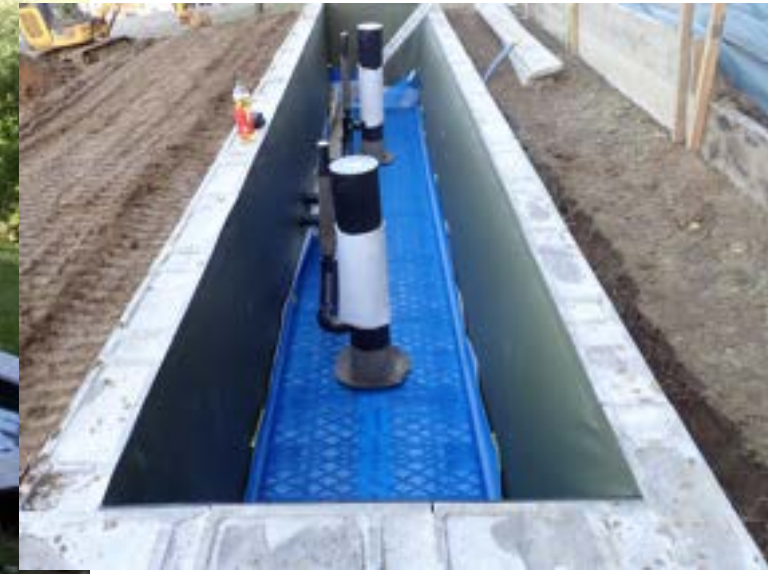
Enterokokken	KBE/100 ml	13	50 (HFW)
Escherichia coli	KBE/100 ml	40	100 (HFW)
Pseudomonas aeruginosa	KBE/100 ml	nn	10 (HFW)

**Bewertung (Mikrobiologie):** Die gemessenen Werte erfüllen die gesetzlichen Vorgaben

Wasseranalyse für: Modoux 28.6.19		20.01.2021	20.01.2021
	Pool	Poolwasser	Füllwasser
	Wert	optimaler Wert	
Leitfähigkeit [ $\mu\text{S}/\text{cm}$ ]	464	100-2000	389 436
Redoxpotential [mV]		>200	
pH-Wert		6.5 - 9.0	
Kalzium [mg/L]		10-120	
Magnesium [mg/L]		Jan 80	
Natrium [mg/L]		bis 60	
Magnesium [mg/L]		Jan 80	
Kalium [mg/L]		0,5 - 20	
Chlorid [mg/L]		bis 150	
Sulfat [mg/L]		bis 250	
Nitrat [mg/L]	10 bis 10	0.8	0.8 03. Mrz
Nitrit [mg/L]		bis 0.5	
Ammonium [mg/L]		bis 1	
Ptot [mg/L]			
Ortho-P [ $\mu\text{g}/\text{L}$ ]	40 bis 30	als Phosphat	42 17
Organ. P [ $\mu\text{g}/\text{L}$ ]			
Gesamthärte [ $^{\circ}\text{dH}$ ]		bis 20	
TOC [mg/L]			
BSB [mg/L]			
Trübe			



# Semi-Indoor-Pool









# Semi-Indoor-Pool





# Semi-Indoor-Pool



Wir danken für die Aufmerksamkeit



# Semi-Indoor-Pool

