DRYDEN AQUA DISTRIBUTION
SUSTAINABLE WATER QUALITY

DRYDEN POOL ACADEMY
KNOWLEDGE IS POWER!

10 HIGH-LEVEL TRAINING SESSIONS

Live Zoom

Dryden Pool Academy
SESSION 1

SUSTAINABLE POOL DESIGN

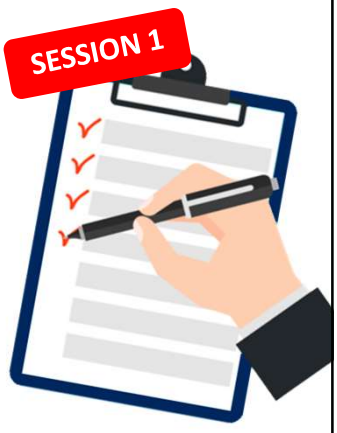
1

AGENDA 9:30 – 10:30 am

zoom

DRYDEN POOL ACADEMY
KNOWLEDGE IS POWER!

9:35	Dryden Aqua Intro
9:40	The pyramid of pool water treatment
	Turnover-rates in private and public swimming pools
	Pressure losses & selection of the right filter pump
	Number of inlets, skimmers and floor drains
	The importance of flow meters: Everything under control!
10:30	Q&A : Questions / Answers



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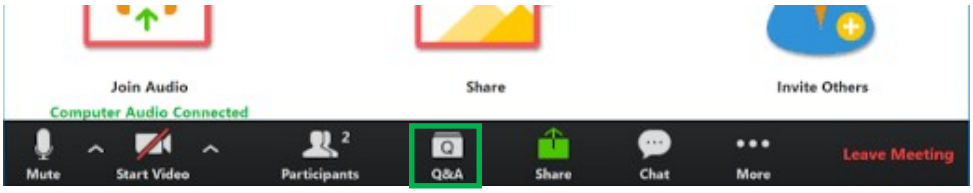
Questions & Answers



Prepare and send us your questions during the meeting using the "Q&A" feature

Use "Chat" for suggestions and feedback

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DRYDEN AQUA DISTRIBUTION
SUSTAINABLE WATER QUALITY

DRYDEN POOL ACADEMY

DRYDEN AQUA INTRODUCTION

2

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WHO ARE WE?

Marine biologist
Dr. Howard DRYDEN

SUSTAINABLE & FULLY-AUTONOMOUS FACTORIES
CAPACITY 50'000 tons of filter media / year

Dryden Aqua Distribution
Büsserach, Switzerland

Dryden Aqua Technology
Bonnyrigg, Scotland

Dryden Aqua Germany
Weimar, Germany

Dryden Aqua North America
Dallas, TX, U.S.A

Dryden Aqua Asia
Shanghai, China

Dryden Aqua Africa
Cape Town, South Africa

NEW HYDROPHOBIC SURFACE ng 2020

AFM® ACTIVATED FILTER MEDIA

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OUR BUSINESS AREAS

SWIMMING POOLS
+ 500'000 pools equipped

WATER TREATMENT

Dryden Aqua Distribution
Büsserach, Switzerland

Dryden Aqua Technology
Bonnyrigg, Scotland

Dryden Aqua Germany
Weimar, Germany

Dryden Aqua North America
Dallas, TX, U.S.A

Dryden Aqua Asia
Shanghai, China

Dryden Aqua Africa
Cape Town, South Africa

AQUARIA
& AQUACULTURE

6

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DAISY® : Dryden Aqua Integrated System

DRYDEN POOL ACADEMY
KNOWLEDGE IS POWER!

DAISY® : A biological approach to pool water treatment

1

AFM®

AFM improves filtration and eliminates the breeding ground on which bacteria can grow and multiply

7

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DAISY® : Dryden Aqua Integrated System

DRYDEN POOL ACADEMY
KNOWLEDGE IS POWER!

DAISY® : A biological approach to pool water treatment

2

APF®

APF improves filtration and also removes dissolved pollutants: All vital nutrients for bacteria. No food => no growth

8

8

DAISY® : Dryden Aqua Integrated System

DRYDEN POOL ACADEMY

- DAISY® : A biological approach to pool water treatment

PREVENT rather than KILL!

3

ACO®

ACO protects chlorine from photolysis and amplifies the natural disinfection power of the sun

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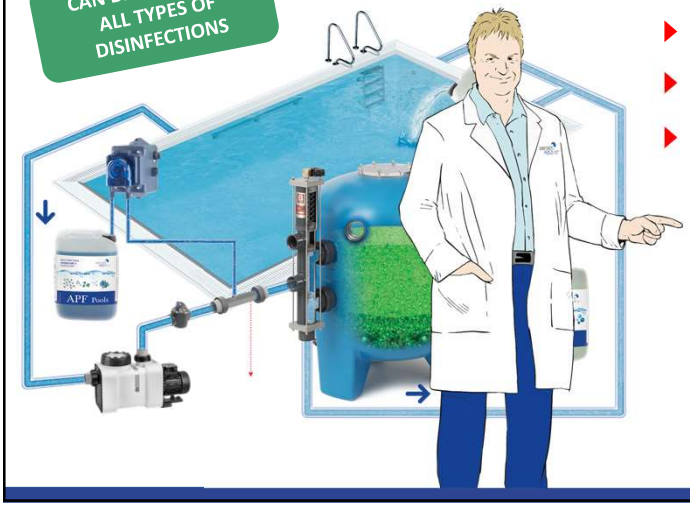
DAISY® : Dryden Aqua Integrated System

DRYDEN POOL ACADEMY

CAN BE USED WITH ALL TYPES OF DISINFECTIONS



DAISY® RESULTS:

- Best filtration down to 0.1 micron
- Oxidation demand reduced by up to 80%
- Less disinfectants = less toxic DBP's

WHAT WE STAND FOR:

- The safest & clearest water
- The best air quality
- The lowest chemical consumption and operating costs

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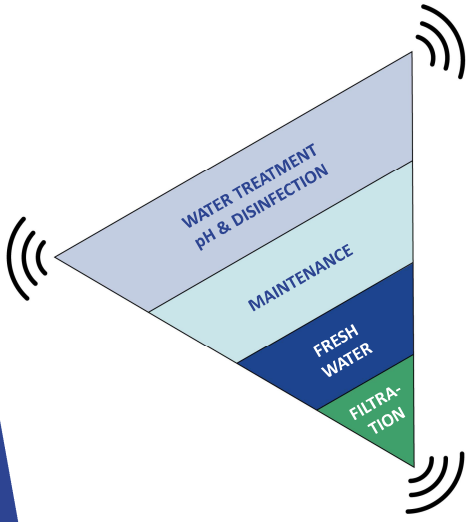
DRYDEN AQUA DISTRIBUTION SUSTAINABLE WATER QUALITY

DRYDEN POOL ACADEMY KNOWLEDGE IS POWER!

DRYDEN POOL ACADEMY

THE PYRAMID OF POOL WATER TREATMENT



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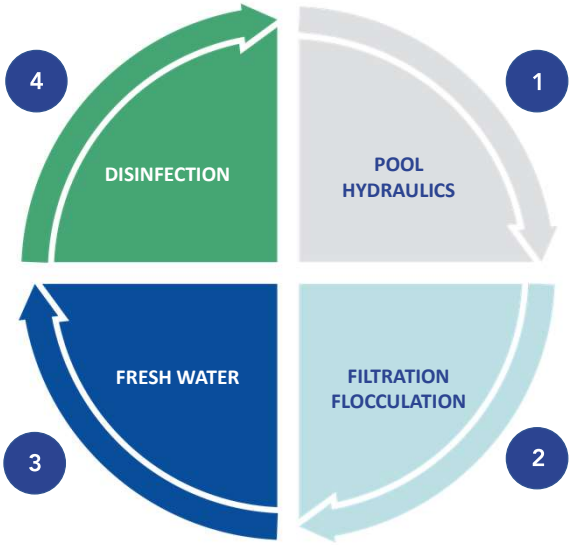
DRYDEN AQUA

The 4 key elements of pool water treatment

DRYDEN AQUA

Chemical consumption will be reduced

- Reduced operating costs & environmental impact
- Optimal bather comfort & safety (less DBP's)



Pool hydraulics must be perfect

- to avoid dead zones
- to reduce energy losses
- to ensure correct filtration & backwash flows

Water consumption will be reduced

- Reduced running costs & energy losses (water, chemicals, heating)
- Reduced environmental impact

Filtration must be optimized

- to remove more organics
- to reduce oxidation demand and DBP's
- To reduce water consumption

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Typical situation when dimensioning a swimming pool

The client says:
"I want a state-of-the-art pool with all the bells & whistles"

1. The pool installer costs at double the client's budget

2. The client asks for economies

3. The installer reduces filter- and pipesizes, buys cheap pumps and filtermedia (sand or cheap glass media).

Results:
-Performance is unsatisfactory
-Water and air quality is not stable
-Running costs are doubled
(energy, water, chemical consumption)

Correcting the faults costs double the original investment!

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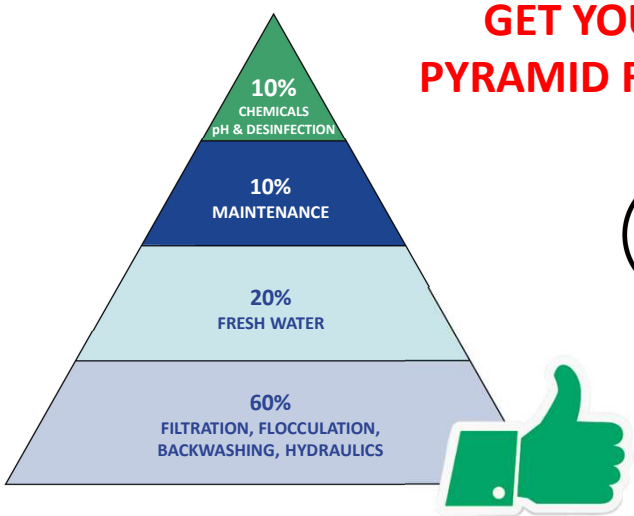
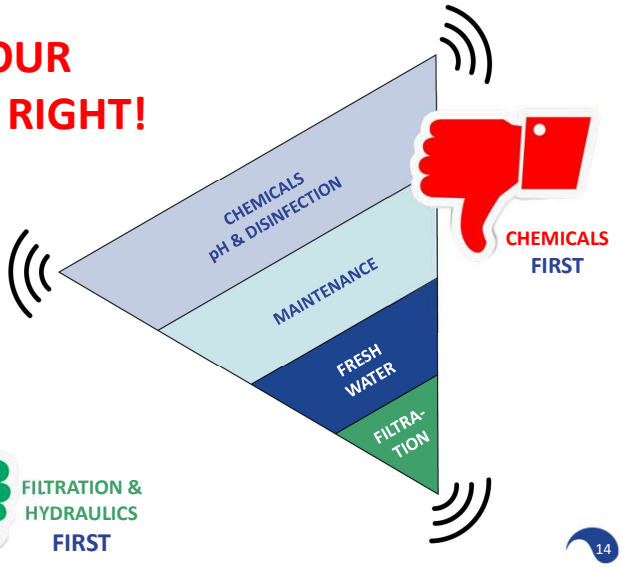
The pyramid of pool water treatment

GET YOUR PYRAMID RIGHT!



FILTRATION & HYDRAULICS FIRST



CHEMICALS FIRST

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DRYDEN AQUA DISTRIBUTION SUSTAINABLE WATER QUALITY

DRYDEN POOL ACADEMY

DRYDEN POOL ACADEMY

TURNOVER RATES IN PRIVATE & PUBLIC POOLS

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DRYDEN AQUA DISTRIBUTION SUSTAINABLE WATER QUALITY

Load and water temperature are key!

DRYDEN POOL ACADEMY

1. The smaller the pool and the higher the load, **the higher the circulation rate must be.**

2. The warmer the water temperature **the higher the circulation rate must be.**

1 bacteria after 8 hours:

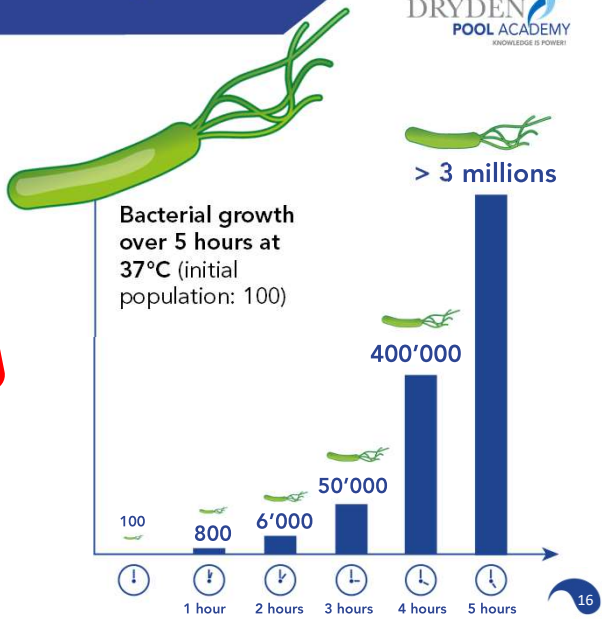
@ 20°: 16 pcs

@ 25°: 256 pcs

@ 30°: 500,000 pcs

Temperature makes a huge difference!

Moving water has less biological growth
=> 24h Filtration is always recommended in public and private pools!



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Which water would you rather drink?

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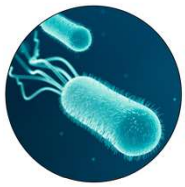
What happens when the filtration is stopped?
=> 24 h filtration also important in private swimming pools!

SESSION 4

Stagnant water => Ideal conditions for the formation of biofilm and the development of pathogens in the filter bed

The filter bed becomes anaerobic and clogs
=> Channels
=> Unfiltered water
=> Pathogens

Heterotrophic bacteria feed on organics while consuming oxygen



O_2

24h

Slow speed at night is the solution!
Energy consumption close to 0
Moving water => Less bacterial growth
Finer filtration
Stable water quality

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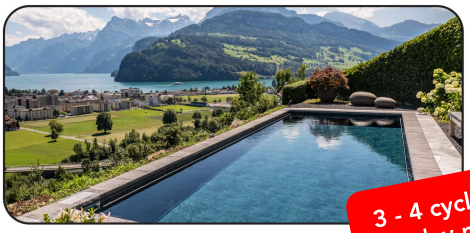
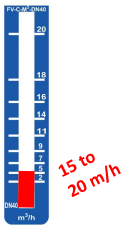
Turnover-rates – Private pools



3 - 4 cycles per day min.



Night

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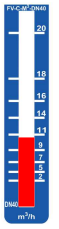

Day

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Turnover-rate in private pools

Every 4 - 6 hours is ok – depending on the load and temperature

Our suggestion

for a 40m3 pool

- **4h turnover rate (10m3/h) during 8 hours (= 2 cycles)**
- **8h turnover rate (5m3/h) during 16 hours (=2 cycles)**

for a 120m3 pool

- **6h turnover rate (20m3/h) during 12 hours (= 2 cycles)**
- **12h turnover rate (10m3/h) during 12 hours (= 1 cycle)**

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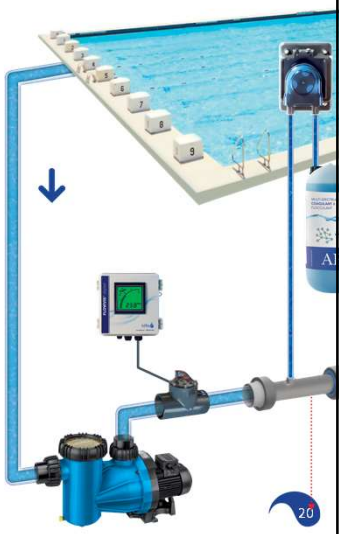
Turnover-rates - Public

Turnover-rate in public pools

Follow your national legislation or norms but never more than 4 hours

MINIMUM EVERY 4 HOURS FOR SWIMMER POOLS



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Turnover-rate according to European DIN norm

Type	depth	temp	time
Swimmer pools	1.35 – 2.2m	28°	4h
Jump pool	>3.4m	28°	6h
Leisure pool	0.6 – 1.35	28°	2h
Warm leisure pool	0.6 – 1.35	35°	1h
Therapy pool	0.6 – 1.35	35°	1h
Baby pool	< 0.5m	30°	0.7h

Whirlpool (400l per person): **15 x volume**

4 seats	1,6m3	24m3/h	4:30 min
6 seats	2.4m3	36m3/h	
10 seats	4.0m3	60m3/h	

Slide pool: 0.67 x m2 + 35m3/h: Minimum is 120m3/h per slide

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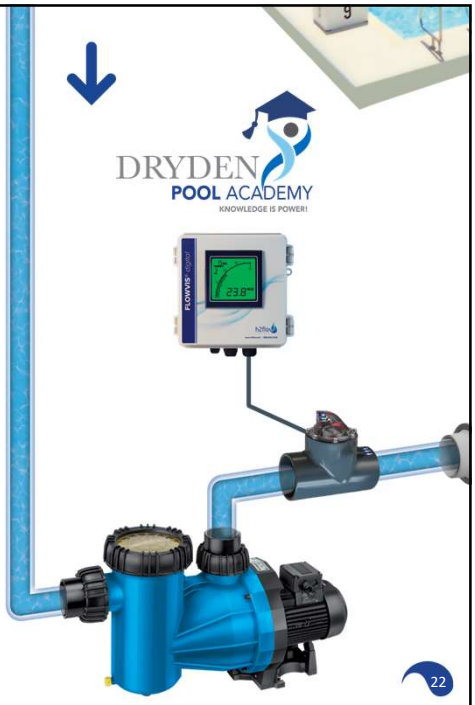
DRYDEN POOL ACADEMY

PRESSURE LOSSES & SELECTION OF THE RIGHT PUMP



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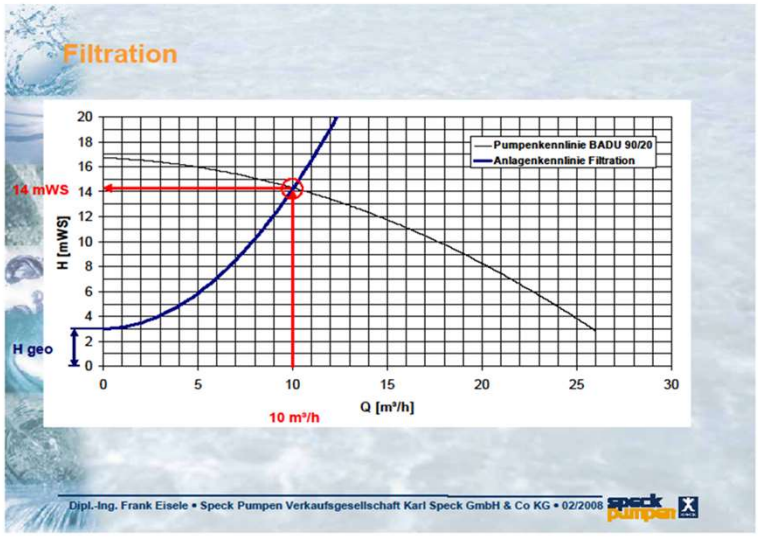
Filtration @ 14mWS (1.4 bar) => 10m3/h

14 mWS
= 1.4 bar



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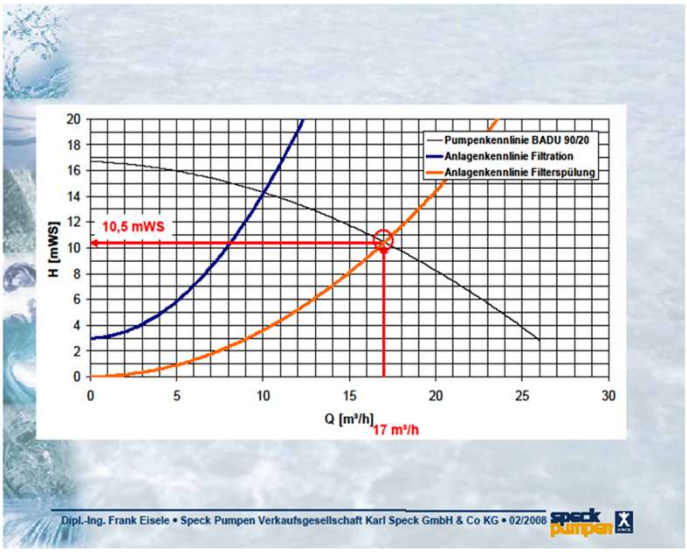
Backwash @ 10mWS (1 bar) => 17m3/h



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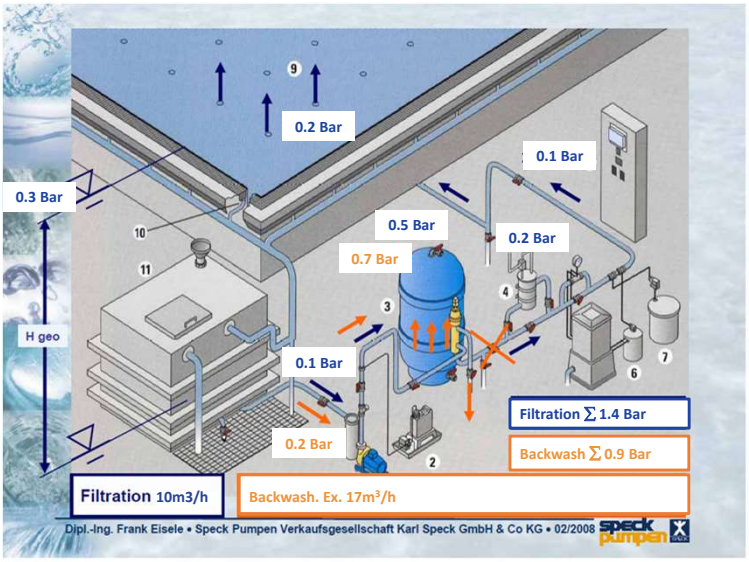
The different headlosses (overflow pool)



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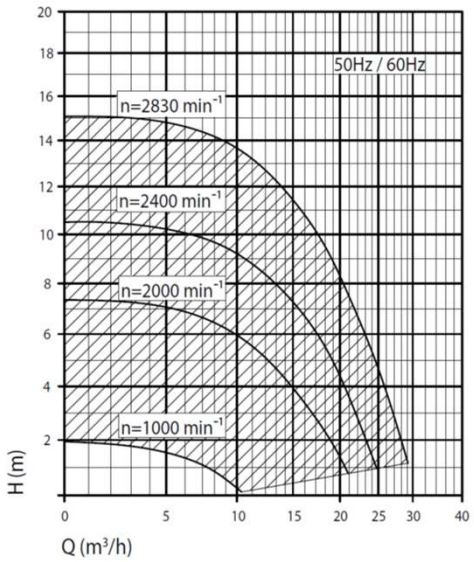
VARIABLE RATE PUMP CURVES



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At what pressure?

Public Pools:
- ΔP filtration 1.5 bar
- ΔP backwash 1.0 bar

Skimmer private pools:
- ΔP Filtration 1.0 – 1.2 bar
- ΔP Backwash 0.6 – 0.9 bar

Use VS pumps/ frequency controllers

Always calibrate and check with flowmeters

Overflow private pools :
- ΔP Filtration 1.2 – 1.5bar
- ΔP Backwash 0.9 bar

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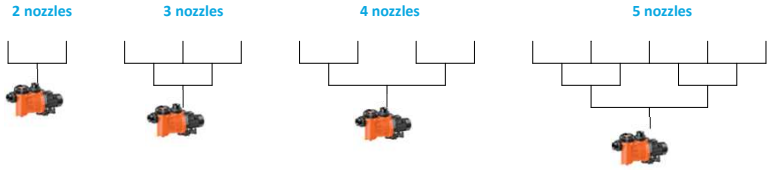
Pumping efficency: The correct distribution of pipelines

Pressure differences are to be avoided!

Solution: « Stag Horn » distribution

Equal pipe length



This principle also applies to configuration of the suction lines

Other possibility: Large collector with reduced flow rate 0.5 - 0.8 m/s

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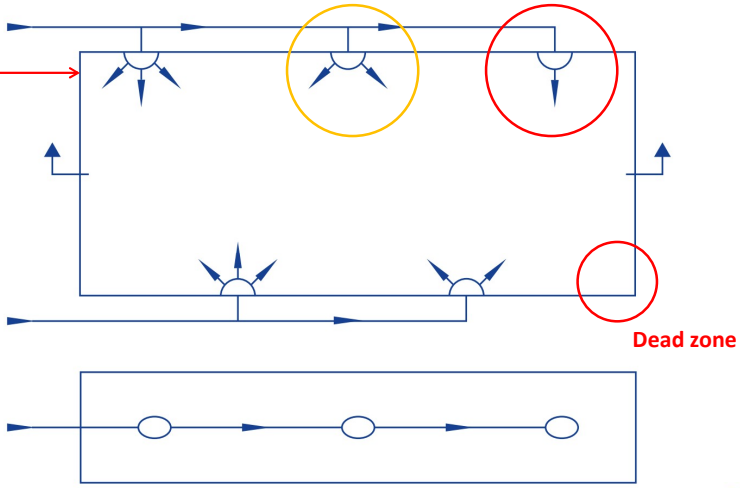
Unequal distribution

INCORRECT

Poor lateral flows due to unequal distribution of flows into the pool

OR Large collector with reduced flow rate 0.5 – 0.8 m/s



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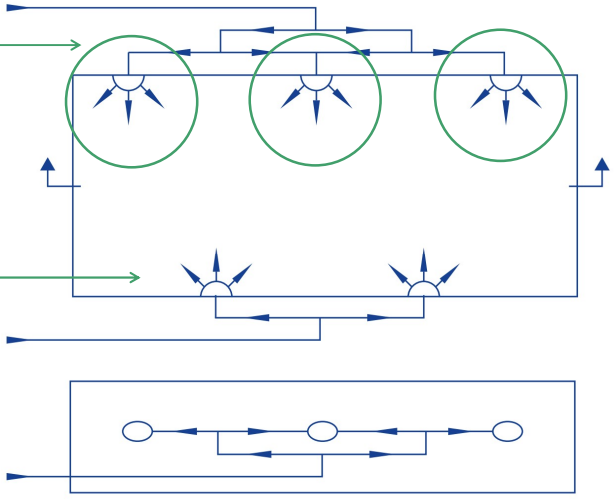
Uniform pressure distribution

THE CORRECT WAY

Optimal lateral flow distribution using equal pipe lengths (staghorn arrangement).

Main feed centred on pool and nozzles offset 50% relative to opposing nozzles.



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Skimmer pool hydraulics

Table of installation Components / filter capacity (evidence)

Length(m)	8	9	10	10	11	12	12	13	15
width (m)	4	4	4	5	5	5	6	6	7
depth (m)	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
Volume (m^3)	45	50	56	70	77	84	101	109	147
Filtration (every 5h)	9m^3/h	10m^3/h	11m^3/h	14m^3/h	15m^3/h	17m^3/h	20m^3/h	22m^3/h	30m^3/h
Filter Ø in mm (30m/h)	Ø 600mm	Ø > 600mm	Ø 700mm	Ø > 700mm	Ø 800mm	Ø < 800mm	Ø900mm	Ø < 900mm 2 x Ø 700mm	Ø 1100mm 2x Ø 800mm
Skimmer 1 x per 30m^2	1	2	2	2	2	2	3	3	3 – 4
Nozzles	3 (Dryden: 6)	3 (Dryden: 6)	4 (Dryden: 7)	4 (Dryden: 7)	5 (Dryden: 7)	5 (Dryden: 7)	5 (Dryden: 8)	6 (Dryden: 8)	6 (Dryden: 15)
Floor Drain	1	1	1	1	1	1	1	1	2

- *** or 1 Skimmer per 8 - 10 m^3/h flowrate**
- **Nozzles** :

diameter	Flowrate at ΔP 2 - 4mWs	penetration
6mm:	0.5 – 0.8 m^3/h	=> 4m
8mm:	1 – 1.5 m^3/h	=> 5 - 6m
12mm:	2.5 – 3.5 m^3/h	=> 8 - 9m
18mm:	5.5 - 8 m^3/h	=> 12 - 14m

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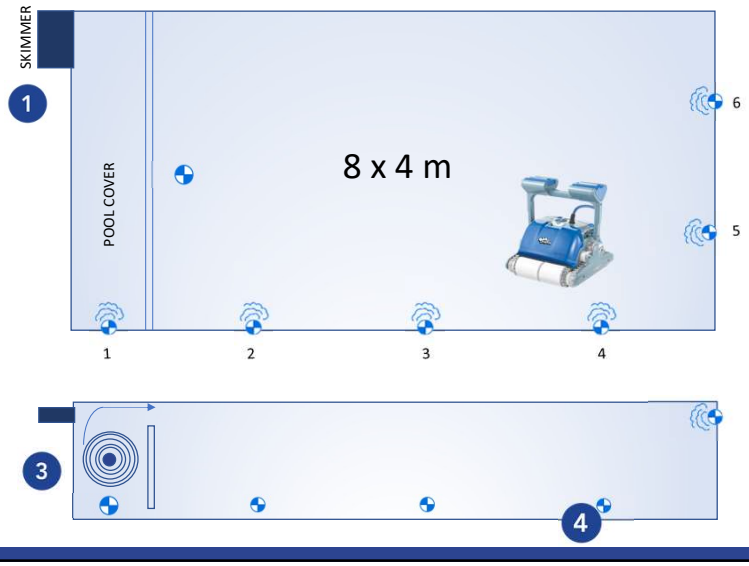
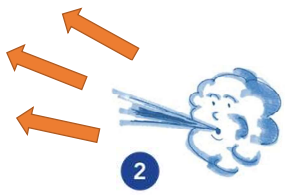
Example 8 x 4 m skimmer pool



1. Skimmer on the same side as pool cover
2. Take wind direction into account : Skimmer on the opposite side
3. Think of the pool cover chamber where water must also circulate
4. Use a pool cleaner



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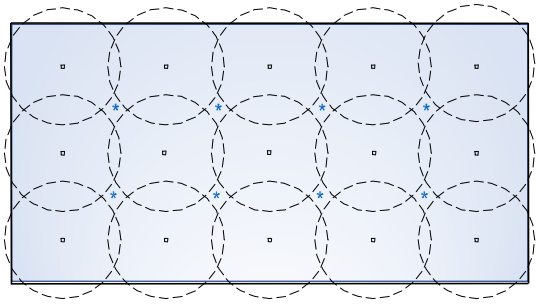
Vertical flow distribution

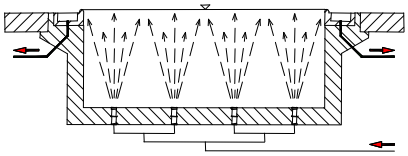


Ideal for big pools and mirror pools

1 bottom nozzle per 6-8 m²

1 nozzle per 6 m² (Water depth < 1,35 m)

1 nozzle per 8 m² (Water depth > 1,35m)



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DRYDEN AQUA DISTRIBUTION SUSTAINABLE WATER QUALITY

DRYDEN POOL ACADEMY

DRYDEN POOL ACADEMY

THE IMPORTANCE OF **FLOWMETERS:** EVERYTHING UNDER CONTROL!

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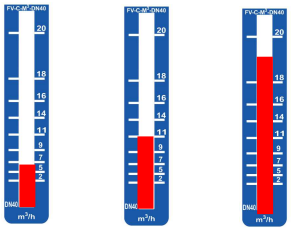
Power is nothing without control!



KNOWING THE FLOW is essential :

- For process security and control
- To set your variable pump's speeds correctly!
  - Achieve best filtration performance
    Better water quality, lower turbidity, Reduced oxidation demand…
  - Optimize energy savings
  - Optimize backwash water savings

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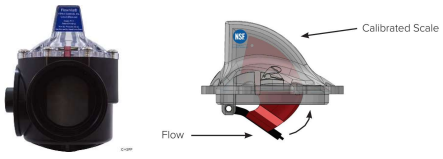
FlowVis – Your pool's speedometer

2 in 1

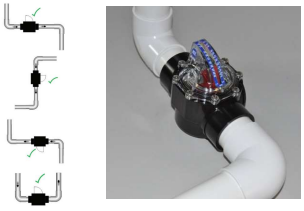
INNOVATIVE



Unique patented design
Flowmeter + NRV

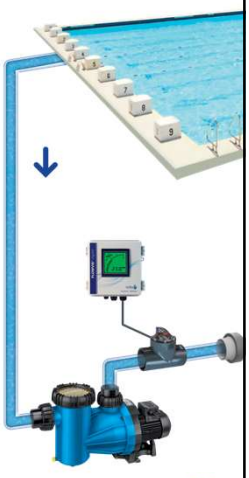
FlowVis® is more than just a flow meter, it is also a fully functioning non return valve (models DN40 & DN50) !

FLEXIBLE



You cannot install it wrong!

- No need for straight pipe before or after
- No calibration required
- Can be installed right next to other fittings
  Can be installed horizontally, vertically or even upside down!



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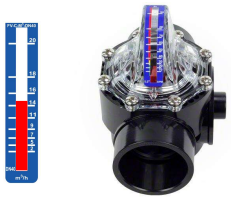
FlowVis – Your pool's speedometer

M³/H

CLEAR READING



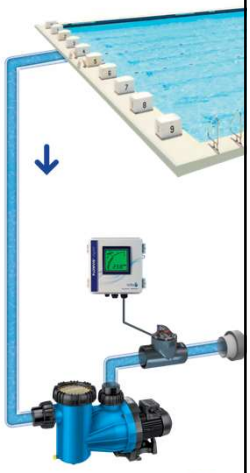
Clear, easy to read scale in m3/h

No floats, No paddle wheels
Will not provide inaccurate readings
Will not stick or bounce
Maintains accuracy even with air in the system

RELIABLE

Reliable flow measurement

Only NSF 50 level 1 certified flow meter in the world
Verified average accuracy of 97,9% across the entire range!



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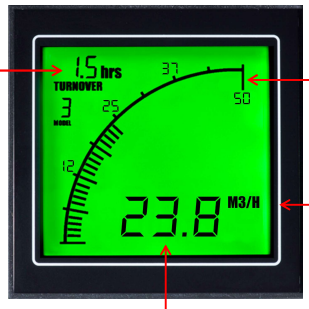
FlowVis – Optional digital display

NEW DIGITAL DISPLAY

Turnover rate in hours

Graphical display of flowrate



Different measurement option (US GPM, LPM, M3/H)

Digital readout of flowrate

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FlowVis – 2021 range

H_2Flow - FlowVis Flow Meter C/90

The Flow Meter FlowVis® from H_2Flow can be installed in every direction. DN 40 and 50 has included a NRV (not return valve). The average accurracy is 98%. The product is NSF 50 certified and a product of high quality. Scale in m³/h. Made in the USA.

Item No.	Description			List price € excl. VAT
90019	New FlowVis® Flow Meter with NRV	d25/32 mm inside/outside	1,2 - 5,4 m³/h	87.00
90020	FlowVis® Flow Meter with NRV*	d50 mm	2,4 - 21 m³/h	179.00
90021	FlowVis® Flow Meter with NRV*	d63 mm	2,4 - 24 m³/h	179.00
90026	New FlowVis® Flow Meter*	d75 mm (to glue outside)	7,0 - 45 m³/h	179.00
90022	FlowVis® Flow Meter**	d90 mm	16 - 54 m³/h	495.00
90023	FlowVis® Flow Meter**	d110 mm	27 - 102 m³/h	530.00
90027	New FlowVis® Flow Meter**	d160 mm	68 - 227 m³/h	730.00
90028	New FlowVis® Flow Meter**	d200 mm	113 - 420 m³/h	920.00
90030	New FlowVis Digital Display for all installations: Digital Display in casing			870.00
90032	New FlowVis Flapper with Indicator and magnet for d50mm - d75mm			30.00
90035	New FlowVis Display extension cable 8m			225.00
90024	FlowVis Service Kit d50mm/d63mm/d75mm (new gasket, springs, flap)			60.00
90025	FlowVis Service Kit d90mm/d110mm (new gasket, springs)			40.00

Models available from ⌀25mm to ⌀200mm

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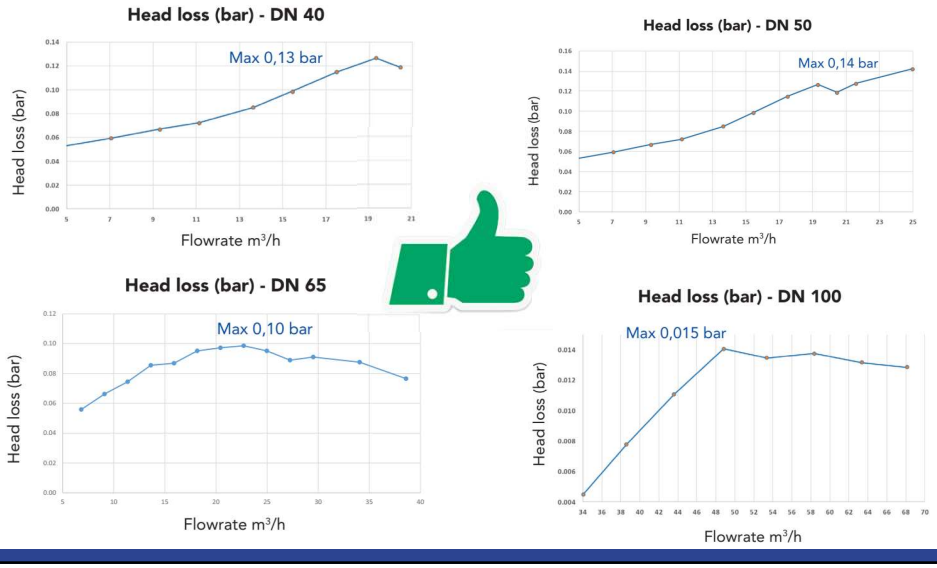
FlowVis – Low Head losses



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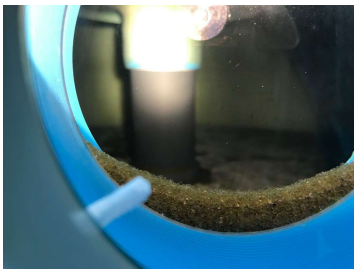
Public indoor pool Breitenbach Aqua Solar, Switzerland



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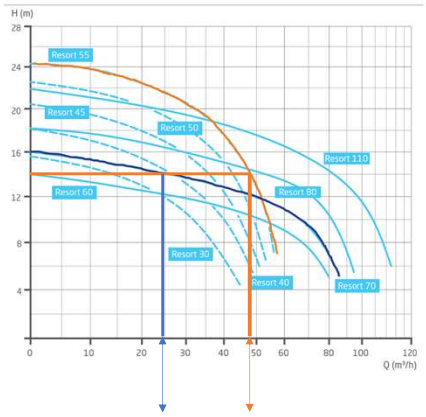
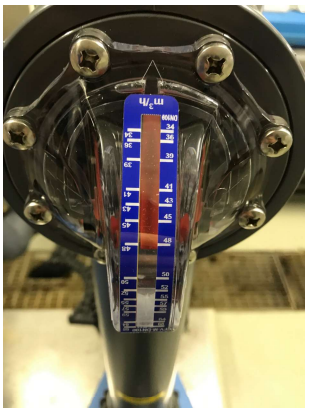
FlowVis: Too low backwash velocity 24m3/h instead 50m3/h: loss 1.4 bar



Badu Resort 70 3kW, big impeller => flat curve

Badu Resort 55 4kW, small impeller=> steep curve



Problem:
Pressure loss 1.4 bar while backwashing

Only 4 x DN50 aspirations

1 x ZPM DN100: 0.2 bar

A lot of 90° fittings

Solution: Badu Resort 70 (3kW) changed to Resort 55 (4kW)

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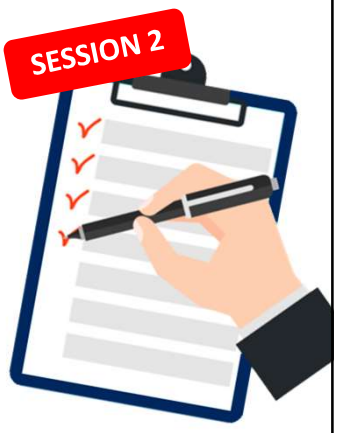
JANUARY 29th 2021

zoom

DRYDEN POOL ACADEMY
KNOWLEDGE IS POWER!

SESSION 2 : FILTRATION AND BACKWASH



- Overview of the different types of filters and filter media
  (Sand, Antrazith H, Antrazith N, Activated carbon, AFM: What to use when)
- Filter hydraulics: The importance of the filter design (The right hardware)
- How to calculate filtration (and backwash) velocities
- Filtration velocities and filtration performance
- How to properly backwash a sand filter

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DRYDEN AQUA DISTRIBUTION
SUSTAINABLE WATER QUALITY

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Questions / Answers

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POOL ACADEMY
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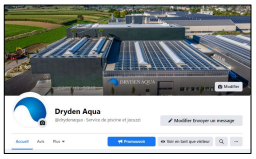

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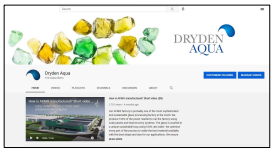

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