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Leopold Underdrain vs. Nozzle Floor

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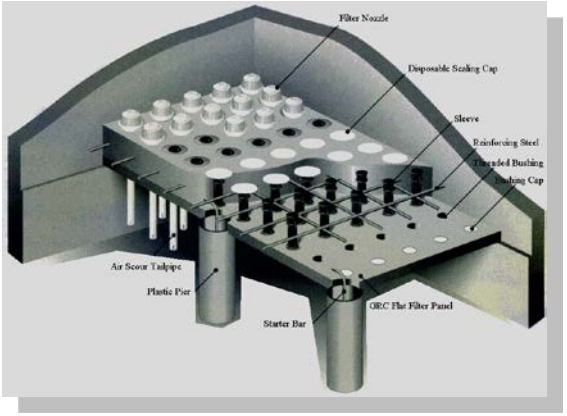
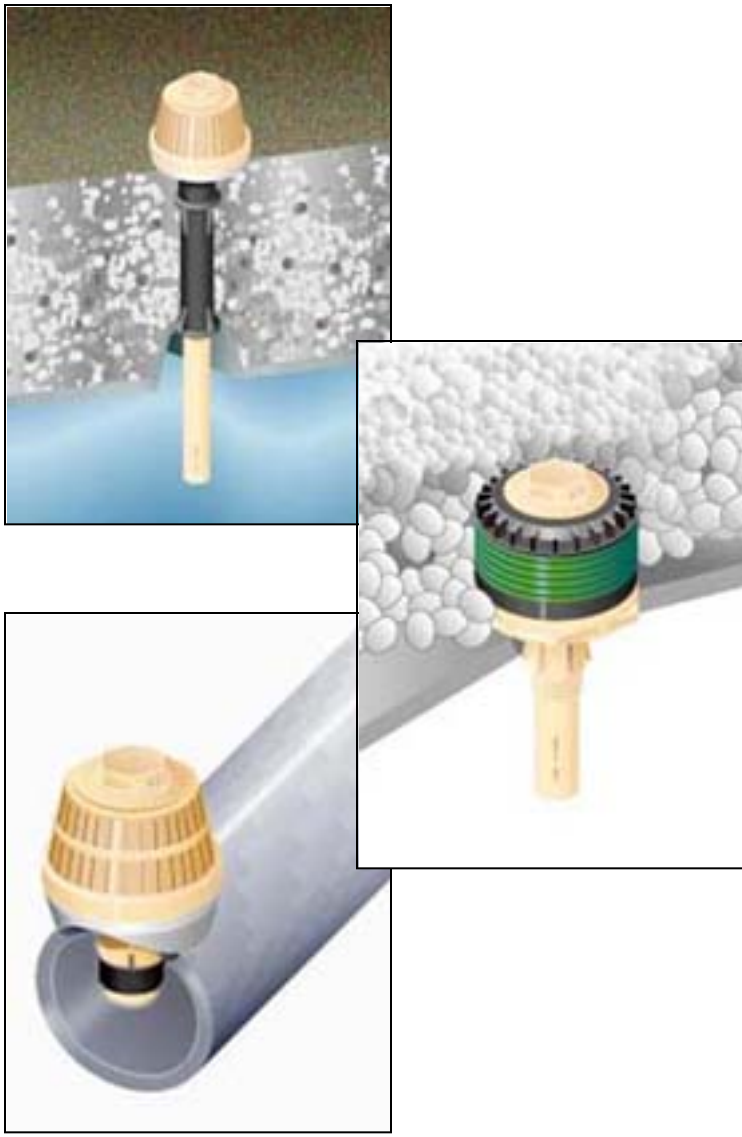
Dual Parallel Lateral Filter Underdrains

Nozzle Floor



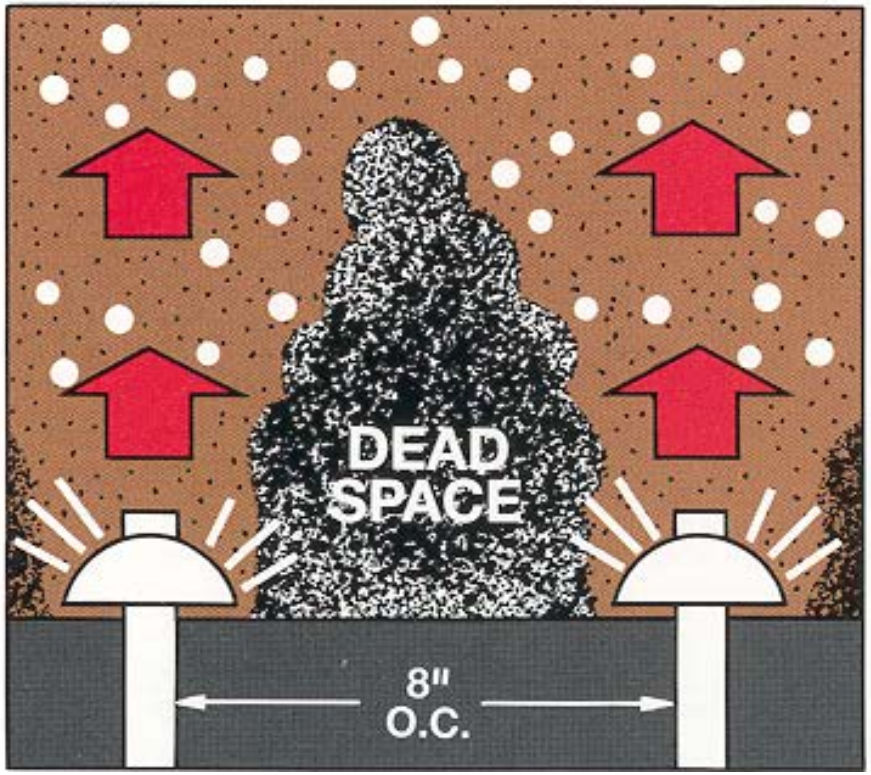
What is a nozzle floor ?

- Typically a false floor – single pass underdrain system
- Can also be pipe laterals with nozzle domes as media strainers
- They are all single pass systems
- They are limited in distribution performance and cleaning efficiency

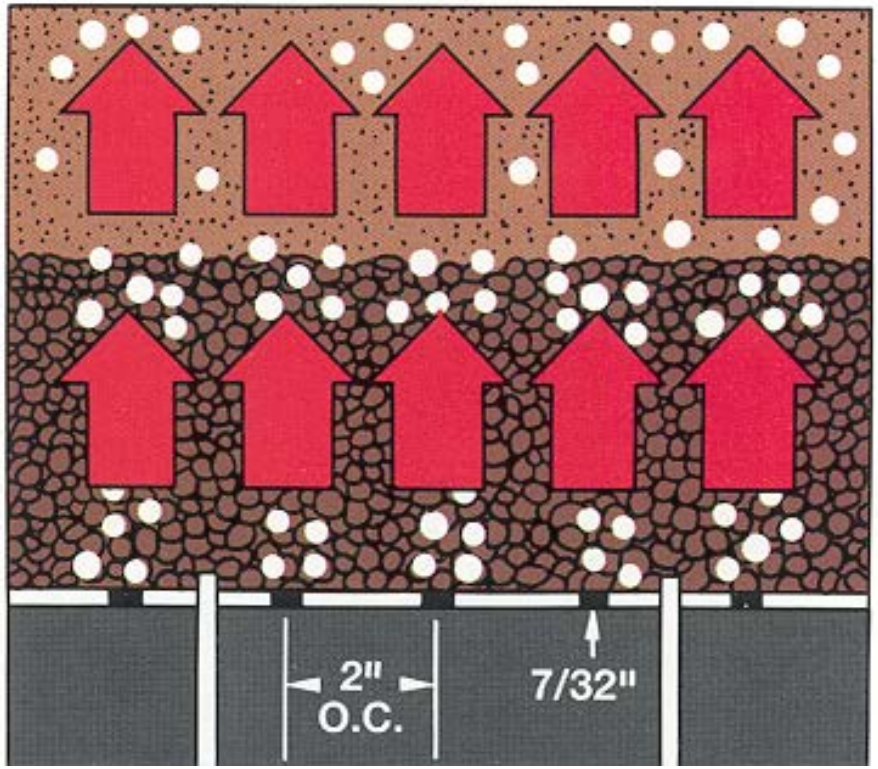


Underdrain Orifice Distribution

Backwash Efficiency

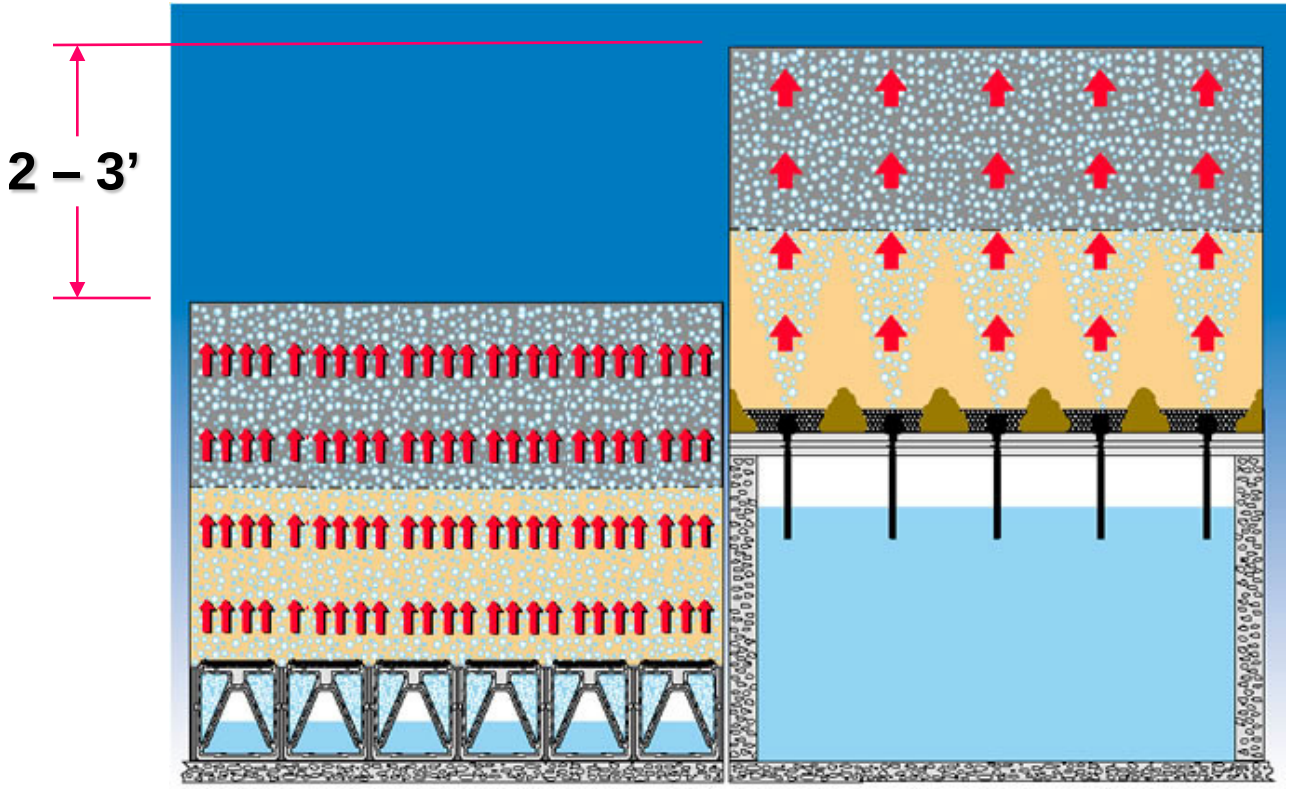


- 5 nozzles/ft^2 or 55 nozzles/m^2 - acceptable
- < 4 nozzles/ft^2 or 40 nozzles/m^2 – large dead zones



- 24 nozzles/ft^2 or 268 nozzles/m^2 - good

Shorter Filter Depth



Leopold Flat Bottom Flume

Conventional Nozzle Floor

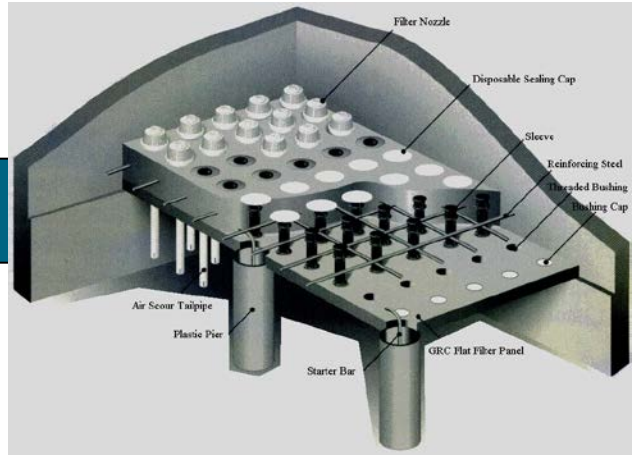
Component Comparison between Nozzles and Leopold Underdrain

- Type S Universal Underdrain with IMS Cap
- End Caps
- Angle Seal
- Grout

Undedrain

- Reinforcing Bar – between each and every nozzle assembly 6in centres and 0.5in steel rebar.
- Concrete – poured to at least 6 inch over the nozzle stem assembly
- Column supports – to create the plenum floor beneath the nozzles
- Starter bar – holds columns in place during placement of panels
- Nozzle Panels – to hold and position nozzles in place
- Panel thread bushings – accepts nozzle sleeves
- Panel thread caps – protects bushings during placement of panels
- Sleeves – accepts air/water stems and dome
- Stems – allows air water wash per dome
- Domes – keeps media in filter box and out of plenum
- Disposable sealing caps for construction purposes

Nozzles



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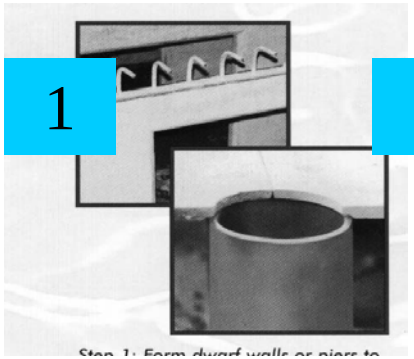
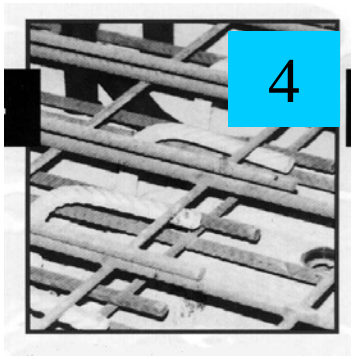
Construction time typically 2 weeks per filter



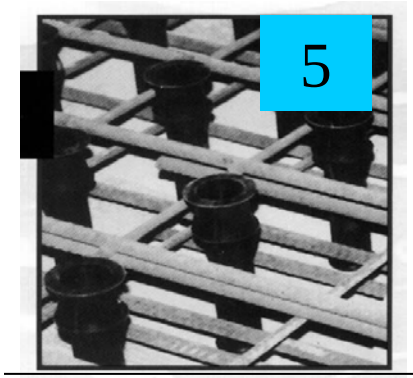
Place columns

Place panels

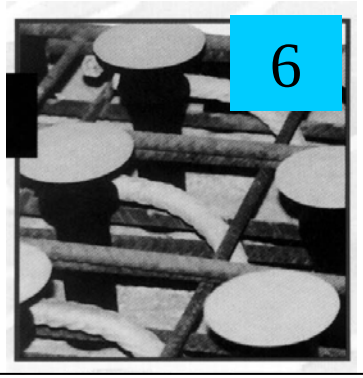
SS shim level



Pace rebar



Thread sleeves



Cap sleeves

Pour concrete

Remove caps

Underdrain is normally 2-3 days

Comparison of components in Floors

National Filtration Plant 1000 ML/d WTW

Number of nozzles	139,968
Components per nozzle	5
Total nozzle bits	699,840
Dwarf wall supports	144
Rebar lengths	15,000
Concrete floor	2359m^3

Total component inventory for job: 715,000

Number of block	11,328
End Caps	2832
Wall sleeves	2832
Angle seals	48
Grout	120m^3

Total component inventory for job: 17,040

<2.5% of the nozzle floor components

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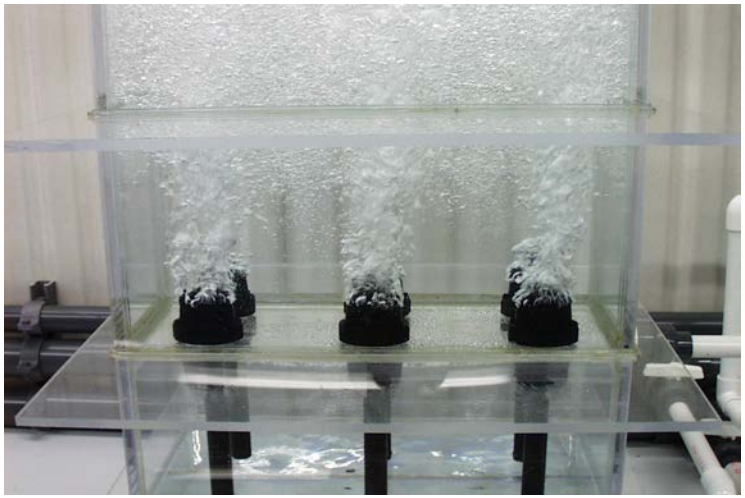
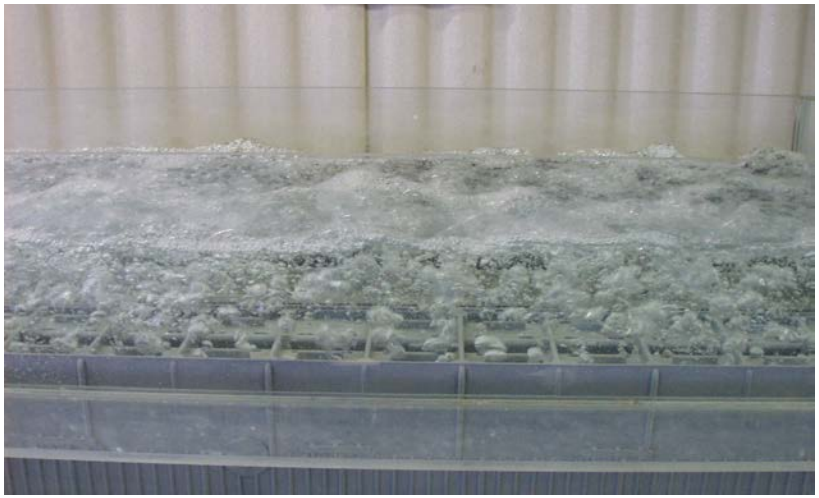
Technical Comparison of Filter Floors

Nozzle



Nozzle Density	36/sqm
Nozzle coverage	15% of area
Depth of plenum	1m
Maldistribution	+/- 10% across filter
Gravel barrier layer	75-100mm
Technical support from plastic molder manufacturer	

Leopold



Orifice density	248/sqm
Block coverage	90% of area
Depth of plenum	1m
Maldistribution	+/- 5% across filter
Depth of Block IMS Cap	220 – 330mm 25mm
Technical support from Leopold with 85+ years of filter experience	

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Comparing the Installed Cost of the Underdrain

What to look out for in comparison

Cost of Nozzles	Cost of Leopold Underdrain
• Nozzle Components • Floor panels • Additional excavation • Additional concrete/piling • Additional rebar • Additional TIME on site • Spares • Installation TIME • Gravel	• Cost of Block + IMS Cap + Anchors • Cost of Grout • Cost of installation supervision
Total Floor Cost $$$$	Total Underdrain Cost $$

Cost Comparison Example:

Project in the UK

	Nozzle Floor	Leopold	Leopold
Sale Price of Filter Floor		H Flume	Flat Bottomed Flume
12 filters 24 cells	$620,400.00	$815,800.00	$815,800.00
26ft x 35 ft			
Additional Civil Eng Costs	$830,838.00	$129,046.00	$8,289.00
Total Construction	$1,451,547.00	$944,846.00	$824,089.00
Material Cost			
Cost Difference	**176%**	**115%**	**100%**
These figures do not include any installation savings			

Conclusions

- INSTALLED COST Leopold Type S® Universal Underdrain can be up to 50% of the cost of a nozzle floor
- Leopold equipment is technically superior with maldistribution across a lateral of <2% in most filter configurations
- The civil engineering work more complex for a nozzle floor.
- With the Leopold System, you get better overall value
  - Better Distribution, Better Filter Runs, Lower Cost of Ownership
  - The Consulting Engineer wins – more robust design, modern technology
  - The Contractor wins – easier to install, lower cost of installation, less time


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