

MLSS - Minimum Leaching System Spread

Technical Standards Appendix A

Minimum Leaching System Spread (MLSS)

- Dictates minimum distance a leaching system must be spread along contours
- Only consider natural occurring soils
- Down gradient soil must be taken into account
- Appendix A (pg. 64)

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MLSS Formula


- $MLSS = FF \times PF \times HF$
- FF = Flow Factor**-Based on the number of bedrooms, i.e.; each bedroom is a multiple of .5 (2-4 bedrooms) or .25 after 4 bedrooms
 - 2 bedrooms = 1.0
 - 3 bedrooms = 1.5
 - 4 bedrooms = 2.0
 - 5 bedrooms = 2.25

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FACTOR TABLES
FLOW FACTOR (FF)

Flow Factor = Design Flow/300

Typical Uses	Flow Factor (FF)
<i>Residential:</i> The Design Flow for each bedroom is 140 Gallons Per Day (GPD) except for additional bedrooms beyond 4 in a single-family residential building which have a 75 GPD per bedroom design flow.	
<i>Single-family homes:</i>	
2 Bedroom Home = 300-300	1.0
3 Bedroom Home = 450-300	1.5
4 Bedroom Home = 600-300	2.0
5 Bedroom Home = 750-300	2.25
Increase FF by 0.25 for each additional bedroom	
<i>Multi-family buildings:</i>	
Same as above except 5 Bedrooms = 750-300	2.5
Increase FF by 0.5 for each additional bedroom	
Non-Residential, Design Flow (GPD) : 300	(FF)



MLSS Formula

- **MLSS = FF x PF x HF**
- **PF = Percolation Factor**-Based on the perc rate of the naturally occurring soil.
- **Up to 5 min/inch** **1.0**
- **5.1 to 10 min/inch** **1.2**
- **10.1 to 20 min/inch** **1.5**
- **20.1 to 30 min/inch** **2.0**

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PERCOLATION FACTOR (PF)

Percolation Rate	Percolation Factor (PF)
Up To 5.0 Minutes/Inch	1.0
5.1 To 10.0 Minutes/Inch	1.2
10.1 To 20.0 Minutes/Inch	1.5
20.1 To 30.0 Minutes/Inch	2.0
30.1 To 45.0 Minutes/Inch	3.0
45.1 To 60.0 Minutes/Inch	5.0

MLSS = FF x PF x HF

- HF = Hydraulic Factor**
- Percent slope = rise / run x 100
 - 8 ft (rise) / 100 ft (run) x 100 = 8.0%
 - 8 ft / 50 ft x 100 = 16.0%
 - 6 ft / 40 ft x 100 = 15.0%
 - 12 ft / 50 ft x 100 = 24%
- Depth to Restrictive Layer- Max groundwater, ledge rock, hardpan soil slower than 1"/30min

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HYDRAULIC FACTOR (HF)

		HYDRAULIC GRADIENT (% OF SLOPE)											
		<1.0	1.0-1.9	2.0-2.9	3.0-3.9	4.0-4.9	5.0-5.9	6.0-6.9	7.0-7.9	8.0-8.9	9.0-9.9	10.0-10.9	>10.9
LEACHING SYSTEM DESIGN RESISTANCE PARAMETERS	0.1-17.9	SEE NOTE #1											
	18.0-22.0	72	62	54	48	42	34	30	28	26			
	22.1-26.0	66	56	48	42	34	30	28	26	24			
	26.1-30.0	56	49	42	34	30	28	26	24	20			
	30.1-36.0	48	42	34	30	28	26	24	20	18			
	36.1-42.0	42	36	30	28	26	24	20	18	16			
	42.1-48.0	36	32	28	26	24	20	18	16	14			
	48.1-60.0	30	28	24	22	20	18	16	14	10			
	>60.0	MLSS NEED NOT BE CONSIDERED											

Note #1- Cannot be approved unless a formal hydraulic analysis demonstrates suitability. The hydraulic analysis must confirm compliance with PHC Section 19-13-B103e (a) (4). Sites with no unsaturated naturally occurring soil would not be a candidate for hydraulic analysis since the naturally occurring soil is already in an "overflown" condition (See PHC Section 19-13-B103e (a) (4)).

Example : $S = 8.3\%$

		HYDRAULIC GRADIENT (% OF SLOPE)											
		<1.0	1.0-1.9	2.0-2.9	3.0-3.9	4.0-4.9	5.0-5.9	6.0-6.9	7.0-7.9	8.0-8.9	9.0-9.9	10.0-10.9	>10.9
LEACHING SYSTEM DESIGN RESISTANCE PARAMETERS	0.1-17.9	SEE NOTE #1											
	18.0-22.0	72	62	54	48	42	34	30	28	26			
	22.1-26.0	66	56	48	42	34	30	28	26	24			
	26.1-30.0	56	49	42	34	30	28	26	24	20			
	30.1-36.0	48	42	34	30	28	26	24	20	18			
	36.1-42.0	42	36	30	28	26	24	20	18	16			
	42.1-48.0	36	32	28	26	24	20	18	16	14			
	48.1-60.0	30	28	24	22	20	18	16	14	10			
	>60.0	MLSS NEED NOT BE CONSIDERED											

#1 - Cannot Be Approved Unless Hydraulic Analysis Demonstrates Suitability.

RL = 27"

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MLSS Example

• **MLSS = FF x PF x HF**

- 3 Bedroom House
- Design Perc Rate = 1 inch / 15 min.
- Restrictive Layer = 18"
- S = 2.1 %
- FF = 1.5
- PF = 1.5
- HF = 54
- MLSS = 1.5 x 1.5 x 54 = 121.5 feet

HYDRAULIC FACTOR (HF)

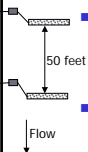
HYDRAULIC GRADIENT (% OF SLOPE)

	-1.0	1.0 2.0	2.1 3.0	3.1 4.0	4.1 6.0	6.1 8.0	8.1 10.0	10.1 15.0	>15.0
0.1- 17.9	SEE NOTE #1								
18.0- 22.0	72	62	54	48	42	34	30	28	26
22.1- 26.0	66	56	48	42	34	30	28	26	24
26.1- 30.0	56	49	42	34	30	28	26	24	20
30.1- 36.0	48	42	34	30	28	26	24	20	18
36.1- 42.0	42	36	30	28	26	24	20	18	16
42.1- 48.0	36	32	28	26	24	20	18	16	14
48.1- 60.0	30	28	24	22	20	18	16	14	10
>60.0	MLSS NEED NOT BE CONSIDERED								

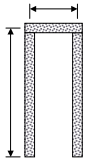
Note #1- Cannot be approved unless a formal hydraulic analysis demonstrates suitability. The hydraulic analysis must confirm compliance with PHC Section 19-13-B103e (a) (4). Sites with no unsaturated naturally occurring soil would not be a candidate for hydraulic analysis since the naturally occurring soil is already in an "overflowed" condition (See PHC Section 19-13-B103e (a) (4)).

Appendix A MLSS (pg. 64-66)

- MLSS Flow factor: Single Family Homes: 0.25 Flow Factor increment beyond 4 bedrooms. Correlates to a 75 GPD design flow for bedrooms beyond 4.
- Leaching systems located within 50 feet of one another and utilizing the same hydraulic window must be evaluated collectively as a common system.
- New construction sites with zero inches of unsaturated naturally occurring soil are not candidates for hydraulic analysis.



U-shaped & L-shaped Leaching Systems



- Crediting of leaching system end connections for U-shaped and L-shaped leaching systems
 - The length of the main row(s) shall only be measured to the center of the interconnecting segment or extension.
 - Crediting allowed for products credited at 7.4 SF/LF or higher if MLSS is not applicable or the water table slope is level (essentially 0% slope).

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Leaching System: Reserve Area

- Reserve areas are not required to meet MLSS, however, where feasible reserve areas should provide additional spread.

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