Georgia Department of Public Health, Environmental Health Section
200 Piedmont Ave SE / East Tower / Suite 486 / Atlanta, GA 30334

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Public Swimming Pool Hydraulic Analysis Worksheet

Pool Name_____ Date _____

Pool Address_____

Shape_____ Perimeter ft._____ Width_____

Length_____ Min. Depth _____ Break Depth_____ Max. Depth _____

Slope = 1 ft. in_____ft. Area = _____ Sq. ft. Volume = _____ gallons

Gunite _____ Poured _____ Other_____ Pipe Mat'l_____
Outdoor, Indoor or Both

Design Flow Rate = Pool Volume _____ (_____) Gal. = _____gpm
Turnover time *1 ( ) Min.

Check minimum skimmer flow rate. If turnover rate is inadequate for minimum skimmer operation (as per manufacturer or rule (25 gpm) then design flow rate must be increased to provide minimum skimmer flow rate.

I. Number of Skimmers Required:

_____Quantity = no. of skimmers required from Swimming Pool Rules.

Surface Area of Pool _____ sq. ft. No. of skimmers required_____
No. of skimmers provided _____.

II. Skimmer Flow Rate:

_____A.) Skimmer flow rate = 100% of Design flow rate = _____gpm.

_____B.) Flow through each Skimmer = skimmer flow rate (above) = (_____gpm) = _____ gpm
for each skimmer no. of skimmers provided*2

_____C.) Select equalizer line cover(s) with a flow in gpm equal to the maximum pump flow divided by the # of skimmers.

III. Number of Inlets Required:

No. of inlets = perimeter / 20' = (_____ / 20') = _____ (Use next whole number)

*1 For pool use minimum 6 hr. turnover (360 min.) or product of 1.5 x average water depth, whichever is less. For special purpose pools and others listed use turnover rate in Rule .07.
*2 Must be 25 – 55 gpm or based on manufacturer specifications.

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IV. Pipe Size Selection

A. Skimmer Line Size:
Select pipe size which gives max. 6' fps velocity at skimmer flow rate.

No. Skimmers Served by Pipe	Branch 1 _____	Branch 2 _____	Branch 3 _____	Branch 4 _____
Pipe Size	_____	_____	_____	
Flow in Pipe	_____	_____	_____	_____
Velocity (fps)	_____	_____	_____	_____

(Indicate which chart used for velocity numbers) _____

B. Return Line Size:
Select pipe size and branches, which gives max. 8 fps velocity at design flow rate.

No. inlets served by pipe	Branch 1 _____	Branch 2 _____	Branch 3 _____	Branch 4 _____
Pipe Size	_____	_____	_____	_____
Flow in pipe	_____	_____	_____	_____
Velocity (fps)	_____	_____	_____	_____

(Indicate which chart used for velocity numbers) _____

V. Main Drain Pipe and (Suction) Outlet Covers Selection

A. Main Drain Size:
Select pipe size which gives max. 6 fps velocity at highest flow rate on the pump curve.

Pipe size _____ [1]Max. Pump Flowrate _____Velocity (fps) _____

B.

Pipe Size	Cover Size (each)	[1,2] Max.Pump flow (gpm)	# of Covers	Flowrate/Cover* (Q=Max. flow/N-1)	(Capacity) (All Covers)

Frame & Grate Cat. No. _____ Quant._____
1. Use the pump's maximum flow rate from the pump curve to obtain flowrate/cover.
2. If therapy flow is through these covers, this flow must also be figured into all calculations.
*Covers meet APSP-16

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CALCULATE RETURN LINE LOSS:*

STATE WHICH CHART, GRAPH, NOMIGRAPH, ETC. USED_____ADD _____ AT BOTTOM OF COLUMN

1. Straight pipe size_____ = _____@_____gpm
   # ____Elbows x Equiv. Length_____ = _____
   # ____Tees x Equiv. Length _____ = _____
   #____ Valves x Equiv. Length _____ = _____
   Friction loss per 100' _____x total equiv. length _____ ÷100 = _____ ft.
   (for above pipe size)

2. Straight pipe size_____ = _____ @ _____gpm
   # ____Elbows x Equiv. Length _____ = _____
   # ____Tees x Equiv Length _____ = _____
   #____ Valves x Equiv. Length _____ = _____
   Friction loss per 100' _____x total equiv. length _____ ÷100 = _____ ft.
   (for above pipe size)

3. Straight pipe size_____= _____@_____gpm
   # ____Elbows x Equiv. Length _____ = _____
   # ____Tees x Equiv. Length _____ = _____
   #____ Valves x Equiv. Length _____ = _____
   Friction loss per 100' _____x total equiv. length _____ ÷100 = _____ ft.
   (for above pipe size)

4. Straight pipe size_____= _____@_____gpm
   # ____Elbows x Equiv. Length _____ = _____
   # ____Tees x Equiv. Length _____ = _____
   #____ Valves x Equiv. Length _____ = _____
   Friction loss per 100' _____x total equiv. length _____ ÷100 = _____ ft.
   (for above pipe size)

5. Straight pipe size_____= _____@_____gpm
   # ____Elbows x Equiv. Length _____ = _____
   # ____Tees x Equiv. Length _____ = _____
   #____ Valves x Equiv. Length _____ = _____
   Friction loss per 100' _____x total equiv. length _____ ÷100 = _____ ft.
   (for above pipe size)

6. Straight pipe size_____= _____@_____gpm
   # ____Elbows x Equiv. Length _____ = _____
   # ____Tees x Equiv. Length _____ = _____
   #____ Valves x Equiv. Length _____ = _____
   Friction loss per 100' _____x total equiv. length _____ ÷100 = _____ ft.
   (for above pipe size)

Friction loss due to inlet resistance at _____ gpm = _____ ft.
(from manufacturer)

Total Return Line friction loss = _____ft.
(add all _____ totals) *(Enter on page 6)

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CALCULATE SKIMMER LINE LOSS: *
STATE WHICH CHART, GRAPH, NOMIGRAPH, ETC. USED _____ADD ____ AT BOTTOM OF COLUMN

1. Straight pipe size _____ = _____ @_____gpm
#_____ Elbows x Equiv. Length _____ = _____
#_____Tees x Equiv. Length_____ = _____
#_____ Valves x Equiv. Length _____ = _____
Friction loss per 100' _____ x total equiv. length _____ ÷ 100 = ____ft.

2. Straight pipe size _____ = _____@ _____ gpm
_____ Elbows x Equiv. Length _____ = _____
_____ Tees x Equiv. Length _____ = _____
#_____ Valves x Equiv. Length _____ = _____
Friction loss per 100' _____x total equiv. length _____÷ 100 = _____ ft.
(for above pipe size)

3. Straight pipe size _____ = _____ @ _____gpm
#_____Elbows x Equiv. Length _____ = _____
#_____Tees x Equiv. Length _____ = _____
#_____Valves x Equiv. Length _____ = _____
Friction loss per 100' _____ x total equiv. length _____ ÷ 100 = _____ft.
(for above pipe size)

4. Straight pipe size _____ = _____ @ _____gpm
#_____Elbows x Equiv. Length _____ = _____
#_____Tees x Equiv. Length _____ = _____
#_____Valves x Equiv. Length _____ = _____
Friction loss per 100' _____x total equiv. length _____ ÷100 = ____ft.
(for above pipe size)

5. Straight pipe size _____ = _____ @_____gpm
#_____Elbows x Equiv. Length _____ = _____
#_____Tees x Equiv. Length _____ = _____
#_____Valves x Equiv. Length _____ = _____
Friction loss per 100' _____x total equiv. length _____ ÷ 100 = ___ft.
(for above pipe size)

6. Straight pipe size _____ = _____ @ _____gpm
#_____Elbows x Equiv. Length _____ = _____
#_____Tees x Equiv. Length _____ = _____
#_____Valves x Equiv. Length _____ = _____
Friction loss per 100' _____x total equiv. length _____÷ 100 = ____ft.
(for above pipe size)

Friction loss over the weir at _____ gpm = _____ ft.
(from manufacturer)

Total Skimmer Line friction loss = _____ ft.
(add all _____ totals) *(Enter on page 6)

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Total Dynamic Head Required:

Return Line Loss (from page 4)	=	_____ ft.
Filter Loss When Dirty *(see below)	=	_____ ft.
Skimmer Line Loss (from page 5)	=	_____ft.
Heater Loss (from manufacturer)	=	_____ ft.
Other (Multiport valves, etc.) (from manufacturer)	=	_____ ft.
Total Loss		_____ ft.

Pump Selection: (Submit Curve)

Make _____ Model _____, _____gpm @ _____ TDH

Backwash rate _____gpm @ _____ TDH**

Filter Selection:

Filter area required = (Design flow rate) = (_____) = _____
(Flow Rate per sq. ft.) ( )

Flow rate per sq. ft. = (Hi rate = 15 gpm per sq. ft.- minimum 15 inch bed depth)
(Hi rate = 12 gpm per sq. ft. - less than 15 inch bed depth) (Sand = 5 gpm per sq. ft.)
(Cartridge = .3 gpm per sq. ft.) (Vacuum pre-coat = 2 gpm per sq. ft.)
(Continuous vacuum pre-coat = 2.5 gpm per sq. ft.) (Pressure pre-coat = 2 gpm per sq. ft.)

Cat. No. _____ Model _____

Filter Area _____sq. ft. No. Tanks _____ Size _____

Pump Specifications _____ HP _____ Cycle _____ Phase_____ Volt_____RPM

Pool Design Professional _____GA. License # _____

Pool Contractor_____

Approved & Checked By _____ Date _____
(Health Dept.)

* Cartridge Filter = 23.1 ft. Sand Filter = 34.7 ft. Pressure pre-coat = 57.8 ft. Vacuum pre-coat = 4.3 ft.
** Backwash TDH = TDH - Return Piping and Fixtures + Backwash Line Loss