Georgia Department of Public Health
Environmental Health Section
Public Swimming Pools, Spas and Recreational Waterparks Program

Public Swimming Pool Hydraulic Analysis Worksheet

Pool Name_____ Date _____

Pool Address_____

Shape_____ Perimeter ft._____ Width_____

Length_____ Min. Depth _____ Break_____ Max. _____
Depth Depth
Slope = 1 ft. in_____ft. Area = _____ Sq. ft. Volume = _____ gallons

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

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 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.) If wall returns are utilized:
Skimmer flow rate = Design flow rate x 0.8
= _____gpm. x 0.8 = _____gpm

B.) If floor returns are utilized:
Skimmer flow rate = Design flow rate = _____gpm

Flow through each Skimmer:

_____Skimmer flow for each skimmer skimmer flow rate (above) / no. of skimmers provided = (_____gpm) / ( ) = _____ gpm *2

III. Number of Inlets Required: (15' max. spacing)

No. of inlets = perimeter / 15' = (_____) / (15') = _____ (Use next whole number)

*1 For pool use minimum 6 hr. turnover (360 min.). For other pools, use table in Rule .07
*2 Must be at least 25 gpm.

Georgia Department of Public Health
Environmental Health Section
Public Swimming Pools, Spas and Recreational Waterparks Program

IV. Pipe Size Selection

A. Skimmer Line Size:

Select pipe size which give max. 4' – 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 give max. 5 - 10 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) _____

C. Main Drain Size:

Select pipe size which gives max. 6 fps velocity at design flow rate.

Pipe size _____Design flow rate_____Velocity (fps) _____

V. Main Drain Grate Selection

Main drain outlet: (4 to 1 open area ratio each drain)
(2 required) (1 ½ fps max. velocity through grate-each drain) *1

Pipe Size	Grate Size (each)	Flow Area (each)	Velocity (fps.)	(Total Flow,) (Both Drains)

Frame & Grate Cat. No. _____ Quan._____
*1 If therapy flow is through these grates, this flow must also be figured into all calculations.

Georgia Department of Public Health
Environmental Health Section
Public Swimming Pools, Spas and Recreational Waterparks Program

MAIN DRAIN LINE LOSS: *

If wall returns are utilized: Head loss calculation must be based on:

Main drain flow rate = 0.2 x design flow rate

= 0.2 x _____gpm

= _____gpm

Straight Pipe Length (Size_____) = _____

_____ elbows x equiv. length _____= _____
_____ tees x equiv. length _____= _____
_____ valves x equiv. length _____= _____
Total equiv. length = = _____

Friction loss per 100' _____ x total equiv. length _____ ÷ 100 = _____
*1 * (enter on page 6)

If floor returns are utilized: Head loss calculations are based on 100% flow thru skimmers.

Skimmer flow rate = design flow rate

Main drain flow rate = 0

Main drain head loss = 0 (enter 0 on page 6)

*1 = based on above main drain flow rate

Georgia Department of Public Health
Environmental Health Section
Public Swimming Pools, Spas and Recreational Waterparks Program

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)

Georgia Department of Public Health
Environmental Health Section
Public Swimming Pools, Spas and Recreational Waterparks Program

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)

Georgia Department of Public Health
Environmental Health Section
Public Swimming Pools, Spas and Recreational Waterparks Program

Total Dynamic Head Required:

Main Drain Line Loss (from page 3)	=	_____ ft.
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. = (Diatomite = 1 gpm per sq. ft.) (Hi rate = 15 gpm per sq. ft.)
(Sand = 5 gpm per sq. ft.) (Cartridge = .3 gpm per sq. ft.)

Cat. No. _____ Model _____

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

Pump Specifications _____ HP _____ Cycle _____ Phase_____ Volt_____RPM

Certified Contractor _____Certification Number _____

Representing _____

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

* Cartridge Filter = 23.1 ft. Sand Filter = 34.7 ft. Pressure D.E.= 57.8 ft. Vacuum D.E.= 4.3 ft.

** Backwash TDH = TDH - Return Piping and Fixtures + Backwash Line Loss