



August 24, 2009

MEMORANDUM

BULLETIN SP-02-09

To: All Permit Applicants

From: Thomas H. Goldsbury, P.E., C.B.O., LEED AP
Chief, Building Inspection Division

Subject: **Revision to Simplified Total Dynamic Head Calculation Worksheet**

We have found errors in the “**Flow and Friction Loss per Foot**” table that is part of the referenced worksheet for residential swimming pools that was sent out with Bulletin SP-01-09. Please delete that worksheet and replace it with the attached one.

ANSI/ASP-7 2006 SPECIFIES THREE METHODS FOR DETERMINING THE MAXIMUM SYSTEM FLOW RATE. THE FOLLOWING SIMPLIFIED TDH CALCULATION IS ONE OF THE METHODS SPECIFIED.

SIMPLIFIED MAXIMUM SYSTEM FLOW RATE:

MINIMUM FLOW RATE REQUIRED: 35 GPM PER SKIMMER

1. CALCULATE POOL VOLUME: $\frac{\text{(SURF. AREA)} \times \text{(AVG. DEPTH)} \times 7.48 \text{ (GAL./CUBIC FOOT)}}{\text{(VOL. IN GAL.)}} =$ _____
2. DETERMINE PREFERRED TURNOVER TIME IN HOURS: _____ X 60 (MIN./HR.) = _____ (TURNOVER IN MIN.)
3. DETERMINE MAX FLOW RATE: $\frac{\text{(VOL. IN GAL.)}}{\text{(TURNOVER MINS.)}} =$ _____ + $\frac{\text{(POOL FLOW RATE)}}{\text{(FEATURE FLOW RATE)}} =$ _____ (SYSTEM FLOW RATE)
4. SPA JETS: $\frac{\text{(NO. OF JETS)} \times \text{(JET FLOW)}}{\text{(TOTAL JET FLOW RATE)}} =$ _____ FLOW RATE

(FOR SINGLE PUMP POOL/SPA COMBO, USE THE HIGHER OF NO. 3 OR NO. 4 IN THE FOLLOWING CALCULATIONS FOR THE POOL & SPA)

DETERMINE PIPE SIZES:

BRANCH PIPING TO BE _____ INCH TO KEEP VELOCITY @ 6 FPS MAX. AT _____ GPM MAXIMUM SYSTEM FLOW RATE.

TRUNK PIPING TO BE _____ INCH TO KEEP VELOCITY @ 8 FPS. MAX. AT _____ GPM MAXIMUM SYSTEM FLOW RATE

RETURN PIPING TO BE _____ INCH TO KEEP VELOCITY @ 10 FPS MAX. AT _____ GPM MAXIMUM SYSTEM FLOW RATE

DETERMINE SIMPLIFIED TDH:

1. DISTANCE FROM POOL TO PUMP IN FEET: _____
2. FRICTION LOSS (IN SUCTION PIPE) IN _____ INCH PIPE PER 1 FT. @ _____ GPM = _____ (FROM PIPE FLOW / FRICTION LOSS CHART)
3. FRICTION LOSS (IN RETURN PIPE) IN _____ INCH PIPE PER 1 FT. @ _____ GPM = _____ (FROM PIPE FLOW / FRICTION LOSS CHART)
4. $\frac{\text{(LENGTH OF SUCT. PIPE)} \times \text{(FT OF HEAD / 1 FT OF PIPE)}}{\text{(TDH SUCT. PIPE)}} =$ _____ TDH IN PIPING: _____
5. $\frac{\text{(LENGTH OF RETURN PIPE)} \times \text{(FT OF HEAD / 1 FT OF PIPE)}}{\text{(TDH RETURN PIPE)}} =$ _____

FILTER LOSS IN TDH (FROM FILTER DATA SHEET): _____

HEATER LOSS IN TDH (FROM HEATER DATA SHEET): _____

TOTAL ALL OTHER LOSS: _____

TOTAL SIMPLIFIED TDH: _____

SELECTED PUMP AND MAIN DRAIN COVER:

PUMP SELECTION _____ USING PUMP CURVE _____ FOR SIMPLIFIED TDH & SYSTEM FLOW RATE

MAIN DRAIN COVER _____ (SYSTEM FLOW RATE _____) MUST NOT EXCEED APPROVED COVER FLOW RATE

NOTES: MINIMUM SYSTEM FLOW BASED ON MIN. FLOW PER SKIMMER OF 35 GPM.

DETERMINE THE NUMBER AND TYPE OF REQUIRED IN-FLOOR SUCTION OUTLETS

- DUAL MAIN DRAIN SUCTION OUTLETS @ _____ GPM MAX. FLOW
 MULTI DRAINS SUCTION OUTLETS @ _____ GPM MAX. FLOW
 CHANNEL DRAIN CHANNEL DRAIN @ _____ GPM W/ _____ PORTS

TDH CALCULATION OPTIONS:

FOR EACH PUMP

CHECK ONE

- SIMPLIFIED TOTAL DYNAMIC HEAD (STDH)
COMPLETE STDH WORKSHEET - FILL IN ALL BLANKS
- TOTAL DYNAMIC HEAD (TDH)
COMPLETE PROGRAM OR OTHER CALCS. FILL IN REQUIRED BLANKS ON WORKSHEET & ATTACH CALCULATIONS
- MAXIMUM FLOW CAPACITY
OF THE NEW OR REPLACEMENT PUMP

NOTES:

1. IF A VARIABLE SPEED PUMP IS USED, USE THE MAX. PUMP FLOW IN CALCULATIONS.
2. FOR SIDE WALL DRAINS, USE APPROPRIATE SIDE WALL DRAIN FLOW AS PUBLISHED BY MANUFACTURER.
3. IN-FLOOR SUCTION OUTLET COVER/GRATE MUST CONFORM TO MOST RECENT EDITION OF ASME/ANSI A112.19.8 AND BE EMBOSSED WITH THAT EDITION APPROVAL.
4. PUMP & FILTER MAKE, MODEL AND LOCATION CAN NOT CHANGE WITHOUT SUBMITTING REVISED PLANS AND TDH WORKSHEET.

TOTAL HEAD IN FEET CONVERSION CHART

INCHES MERCURY (VACUUM GAUGE)		0	2	4	6	8	10	12	14	16	18
0	0.0	2.3	4.5	6.8	9.0	11.3	13.6	15.8	18.1	20.3	
1	2.3	4.6	6.8	9.1	11.4	13.7	15.9	18.2	20.4	22.7	
2	4.6	6.9	9.1	11.4	13.7	15.9	18.2	20.4	22.7	25.0	
3	6.9	9.2	11.5	13.7	16.0	18.2	20.5	22.8	25.0	27.3	
4	9.2	11.5	13.8	16.0	18.3	20.5	22.8	25.1	27.4	29.6	
5	11.5	13.8	16.1	18.3	20.6	22.8	25.1	27.4	29.7	31.9	
6	13.8	16.1	18.4	20.6	22.9	25.2	27.4	29.7	31.9	34.2	
7	16.2	18.4	20.7	23.0	25.2	27.5	29.7	32.0	34.3	36.5	
8	18.5	20.7	23.0	25.3	27.5	29.8	32.0	34.3	36.6	38.8	
9	20.8	23.1	25.3	27.6	29.8	32.1	34.3	36.6	38.9	41.1	
10	23.1	25.4	27.6	29.9	32.1	34.4	36.7	38.9	41.2	43.4	
11	25.4	27.7	29.9	32.2	34.5	36.7	39.0	41.2	43.5	45.8	
12	27.7	30.0	32.2	34.5	36.8	39.0	41.3	43.5	45.8	48.1	
13	30.0	32.3	34.5	36.8	39.1	41.3	43.6	45.9	48.1	50.4	
14	32.3	34.6	36.9	39.1	41.4	43.6	45.9	48.2	50.4	52.7	
15	34.6	36.9	39.2	41.4	43.7	45.9	48.2	50.5	52.7	55.0	
16	37.0	39.2	41.5	43.7	46.0	48.3	50.5	52.8	55.0	57.3	
17	39.3	41.5	43.8	46.1	48.3	50.6	52.8	55.1	57.4	59.6	
18	41.6	43.8	46.1	48.4	50.6	52.9	55.1	57.4	59.7	61.9	
19	43.9	46.2	48.4	50.7	52.9	55.2	57.4	59.7	62.0	64.2	
20	46.2	48.5	50.7	53.0	55.2	57.5	59.8	62.0	64.3	66.5	
21	48.5	50.8	53.0	55.3	57.5	59.8	62.1	64.3	66.6	68.8	
22	50.8	53.1	55.3	57.6	59.9	62.1	64.4	66.6	68.9	71.2	
23	53.1	55.4	57.7	59.9	62.2	64.4	66.7	69.0	71.2	73.5	
24	55.4	57.7	60.0	62.2	64.5	66.7	69.0	71.3	73.5	75.8	
25	57.7	60.0	62.3	64.5	66.8	69.1	71.3	73.6	75.8	78.1	
26	60.0	62.3	64.6	66.8	69.1	71.4	73.6	75.9	78.1	80.4	
27	62.4	64.6	66.9	69.2	71.4	73.7	75.9	78.2	80.5	82.7	
28	64.7	66.9	69.2	71.5	73.7	76.0	78.2	80.5	82.8	85.0	
29	67.0	69.3	71.5	73.8	76.0	78.3	80.5	82.8	85.1	87.3	
30	69.3	71.6	73.8	76.1	78.3	80.6	82.9	85.1	87.4	89.6	
31	71.6	73.9	76.1	78.4	80.7	82.9	85.2	87.4	89.7	92.0	
32	73.9	76.2	78.4	80.7	83.0	85.2	87.5	89.7	92.0	94.3	
33	76.2	78.5	80.7	83.0	85.3	87.5	89.8	92.0	94.3	96.6	
34	78.5	80.8	83.1	85.3	87.6	89.8	92.1	94.4	96.6	98.9	
35	80.9	83.1	85.4	87.6	89.9	92.2	94.4	96.7	98.9	101.2	

NOTE: FIELD TDH MUST BE EQUAL TO OR HIGHER THAN THE CALCULATED TDH

CHART 2

THE FOLLOWING CUT SHEETS ARE INCLUDED

DATE _____	<input type="checkbox"/> PUMP	<input type="checkbox"/> HEATER
CONTRACTOR SIGNATURE _____	<input type="checkbox"/> FILTER	<input type="checkbox"/> THERAPY JETS
CONTRACTORS PRINTED NAME _____	<input type="checkbox"/> MAIN DRAIN	<input type="checkbox"/> WATER FALLS
CONTRACTORS CERT. NO. _____	<input type="checkbox"/> OTHER _____	
CONTRACTORS TEL. NO. _____	SWIMMING POOL SPECIFICATION FOR _____	

FLOW AND FRICTION LOSS PER FOOT SCHEDULE 40 PVC PIPE

PIPE SIZE	VELOCITY - FEET PER SECOND					
	6 FPS		8 FPS		10 FPS	
1"	16 GPM	0.14'	21 GPM	0.23'	26 GPM	0.35'
1.5"	37 GPM	0.08'	50 GPM	0.14'	62 GPM	0.21'
2"	62 GPM	0.06'	82 GPM	0.10'	103 GPM	0.16'
2.5"	88 GPM	0.05'	117 GPM	0.09'	146 GPM	0.13'
3"	138 GPM	0.04'	181 GPM	0.07'	227 GPM	0.10'
4"	234 GPM	0.03'	313 GPM	0.05'	392 GPM	0.07'
6"	534 GPM	0.02'	712 GPM	0.03'		

CHART 1