Petition for Declaratory Statement before the Florida Building Commiss

Petitioner:

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I am in the process of designing a residential swimming pool in Bradenton, Florida, in accordance with the 2010 Florida Building Code. It is a 10,700 gallon pool with a therapy spa. I am seeking clarification of the flow and velocity requirements for swimming pool piping contained in three standards referenced in the 2010 Florida Building Code, Chapter R4101.6.1; NSPI-5, APSP-7, and APSP-15 found in Section 403.9 of the Florida Energy & Efficiency Code. As a swimming pool contractor, I am affected when attempting to size pool piping in conformance with the velocity limits found in the three standards. It is my belief that a pool contractor must achieve compliance separately for each standard. If the separate velocity requirements are misinterpreted, project costs will escalate placing an unreasonable financial burden on the average pool buying family and seriously shrinking the market to a point where numbers of pool building contractors would likely go out of business.

This request is prompted by the inclusion of APSP-15 *Standard for Residential Swimming Pool and Spa Energy Efficiency* into the Florida Energy & Efficiency Code, which includes additional pipe velocity requirements as compared to those already referenced in the Florida Building Code, Chapter R4101.6.1.

The three standards and their respective flow and velocity requirements are:

ANSI/NSPI-5, 2003 *Standard for Inground Residential Swimming Pools.*

The objective of this standard is to provide recommended minimum guidelines for the design, equipment, installation, and use of residential inground swimming pools. Maximum velocity limits are; 10 feet per second (fps) in return side piping and 8 fps in suction side piping. The flow and velocity requirements in this standard are intended to insure adequate water flow for sanitation, filtration, filter backwashing, etc. Maximum system flow is not defined in this standard; the flow requirement is that the equipment shall be sized to provide a turnover of the pool water at least once every twelve (12) hours.

The Florida Building Code includes this same requirement in section R4101.6.3

> Water velocity. Pool piping shall be designed so the water velocity will not exceed 10 feet per second (3048 mm/s) for pressure piping and 8 feet per second (2438 mm/s) for suction

piping, except that the water velocity shall not exceed 8 feet per second (2438 mm/s) in copper tubing. Main suction outlet velocity must comply with ANSI/APSP 7.

ANSI/APSP-7, 2006 *Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins.*

The objective of this standard is to provide recommended minimum guidelines for suction entrapment avoidance in the design, equipment, operation, and installation of new and existing swimming pools, wading pools, spas, hot tubs, and catch basins for builders, installers, pool operators, and service professionals. Maximum water velocity limits are; in branch suction piping (piping between dual or multiple outlets) shall be limited to 6 feet per second when one of a pair is blocked. All other suction piping velocities shall be 8 fps for residential pools. This standard does not address return side velocities. The flow and velocity limits in this standard are intended to prevent suction entrapment. I quote "This standard was written to move toward performance-criteria for each identified hazard and allow state authorities to define clear codes for use by designers, builders, and inspectors." Maximum system flow rate is defined as "The flow resulting from the lowest possible total dynamic head (TDH) for a circulation system."

ANSI/APSP/ICC-15, 2011 *Standard for Residential Swimming Pool and Spa Energy Efficiency.*

The objective of this newly adopted conformance standard is to provide recommended minimum guidelines for the energy efficiency of permanently installed residential aboveground/onground and inground swimming pools and inground spas. Maximum water velocity limits are 8 fps in return piping and 6 fps in suction line piping. Maximum filtration flow rate is defined in this standard as "the flow rate needed to turn over the pool water volume in 6 hours (pool volume in gallons ÷ 360 = gpm) or a flow rate of 36 gpm, whichever is greater." Maximum system flow rate is defined in this standard as "the maximum flow rate for the auxiliary pool loads (a spa for example) or the filtration flow rate, whichever is greater." The maximum flow rate for pools without optional auxiliary loads is determined by a mathematical calculation based on pool volume divided by six hours – not the maximum potential flow and/or velocity as defined in the ANSI/APSP-7, 2006 standard.

The adoption of the ANSI-15 standard has created much anxiety in my industry, as to how Building Officials are going to interpret the flow and velocity requirements of the 7 and the 15 standards – the fear is that velocity requirements from the ANSI-15 may be applied to the ANSI-7. If that were to happen, the cost of up-sizing the piping and fittings for virtually every residential pool we build would become prohibitive. The intent of the ANSI-15 standard is most clear when evaluating a swimming pool system without optional auxiliary pool loads, a situation where pipe size is determined exclusively by the calculation pool volume in galloons ÷ 360 = maximum flow rate in gpm.

It is my belief, based on the different objectives and limitations of the ANSI-7 and the ANSI-15 standards, which are specific to each individual standard and differently defined in each standard that they can coexist without any conflict. The ANSI-15 addresses energy conservation and efficiency by creating design guidelines while encouraging lower flow rates and longer filtration times, and the ANSI-7 addresses the life/safety issue of suction entrapment avoidance by requiring operational velocity limits at suction outlets and suction piping.

Therefore, compliance with each of these standards should be an independent process.

A plans examiner can affirm compliance with the design requirements contained in ANSI-5, ANSI-15 and ANSI-7 individually during the permit application review process. The ANSI-7 standard, which requires verification of the performance-criteria; cover/grate flow rating, outlet spacing, etc. can then be affirmed through the inspection process.

With this analysis in mind, my questions regarding flow (velocity) and pipe sizing are:

1. Does a pool contractor achieve compliance with NSPI-5 and R4101.6.3 by applying the design flow rate when specifying pipe sizes?

   For the pool in question, according to my design calculations; to meet the 12-hour turnover requirement, I would need a flow rate of at least 15 gpm and could comply with velocity requirements of 8 ft. fps in the suction piping and 10 fps. in the return piping by specifying 1 ½ inch piping.

2. Does a pool contractor achieve compliance with ANSI/APSP/ICC – 15 by applying the maximum design flow rate when specifying swimming pool filtration pipe sizes, where the maximum design flow rate is the greater of the calculated 6-hour turnover flow rate or the optional auxiliary feature (spa) with the highest design flow requirement if operated by the circulations pump?

   For the pool in question, according to my design calculations; a 6 hour filtration turnover rate is 30 gpm, which is less than the 36 gpm limit allowed by the standard. The spa has 4 therapy jets designed to flow at 15 gpm per jet for a total of 60 gpm. I could then select a multiple-speed pump from the APSP Pool Products Spreadsheet, listed to Curve A, with at least one flow rate which does not exceed the 36 gpm flow for swimming pool filtration and circulation running at low-speed and the 60 gpm for the auxiliary pool load (spa) when running at high-speed (or use two separate pumps, in which case the auxiliary load is not considered). I could then specify 2 inch suction side piping (6 fps @ 60 gpm) and 2 inch return side piping to comply with the velocity requirements of this standard.

3. Does a pool contractor achieve compliance with ANSI/APSP – 7 by applying the maximum operational flow rate when specifying suction pipe sizes?

   For the pool in question, according to my calculations; to meet the flow and velocity limitations size of this standard I would either have to provide a Total Dynamic Head calculation for the system, or provide Simplified TDH calculations, or show the maximum potential flow of the selected pump from the manufacturer's pump curve. I would then have to specify the sizes of; the branch piping between multiple outlets, when multiple outlets are specified, to comply with the 6 fps requirement in branch piping and the 8 fps in suction piping. Return piping is not addressed in ANSI-7, therefore the return side pipe size for this pool is based on design flow rates in accordance with -5 and -15.