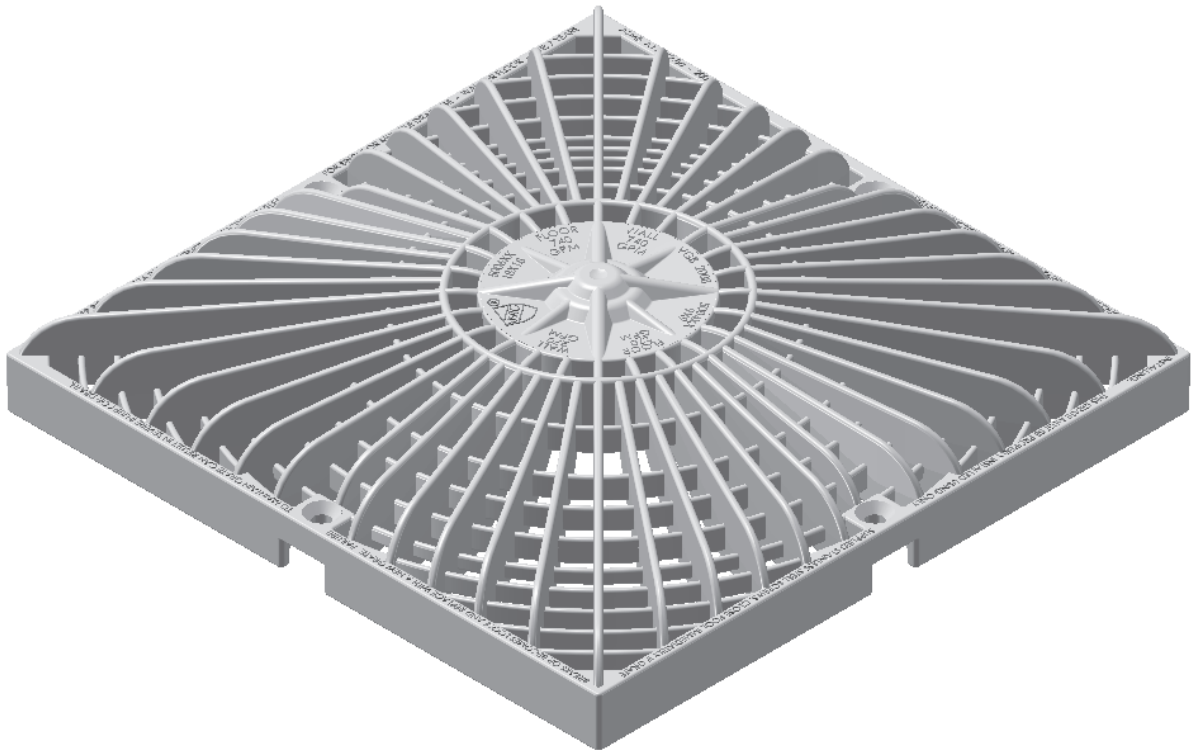


# StarGuard® Square Commercial Main Drain



## Installation Guide

IMPORTANT SAFETY INSTRUCTIONS  
READ AND FOLLOW ALL INSTRUCTIONS  
SAVE THESE INSTRUCTIONS

**© 2010 Pentair Water Pool and Spa, Inc. All rights reserved**

**This document is subject to change without notice**

1620 Hawkins Ave., Sanford, NC 27330 • (919) 566-8000

10951 West Los Angeles Ave., Moorpark, CA 93021 • (800) 831-7133 • (805) 555-5000

StarGuard® and Pentair Water Commercial Pool and Aquatics™ are trademarks of Pentair Water Pool and Spa, Inc. AquaStar Pool Products® is a registered trademark of AquaStar Pool Products, Inc. Unless noted, names and brands of others that may be used in this document are not used to indicate an affiliation or endorsement between the proprietors of these names and brands and Pentair Water Pool and Spa, Inc. Those names and brands may be the trademarks or registered trademarks of those parties or others.

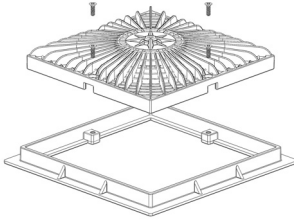
**P/N 510555 - Rev B 03-30-10**

## Contents

WARNINGS and IMPORTANT SAFETY PRECAUTIONS.....	ii
The Virginia Graeme Baker Pool and Spa Safety Act .....	vi
Acts Codes and Standards.....	vii
Hydraulic System Specifications.....	1

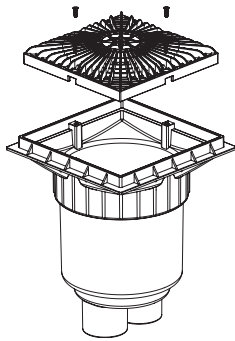
### Section 1

Field Fabricated Sump Installation.....	4
---	---



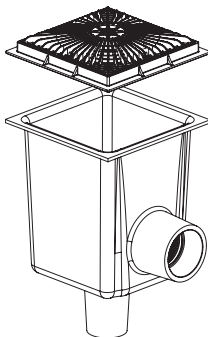
### Section 2

StarGuard® Square Frame and Grates Installation .....	5
P/N 500400 - 500409, 500500 - 500509, 500600 - 500609, 500700 - 500709	



### Section 3

StarGuard® Square Drain with PVC Sump Installation .....	12
P/N 500410 - 500419, 500430 - 500439, 500510 - 500519, 500530 - 500539	



### Section 4

StarGuard® Square Drain with Fiberglass Sump Installation .....	18
P/N 500420 - 500429, 500520 - 500529, 500540 - 500549, 500610 - 500619, 500710 - 500719	

### Section 5

Replacement Parts .....	25
-------------------------	----

**Required tools:** No. 2 Philips head screwdriver and torque driver (in-lbs).

**READ, THEN KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE**

## WARNINGS AND IMPORTANT SAFETY PRECAUTIONS

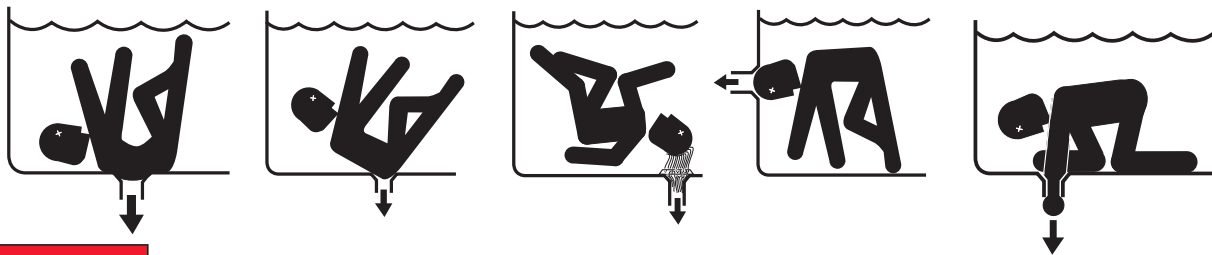
**⚠ WARNING** INSTALLERS, POOL OPERATORS AND POOL OWNERS MUST READ THESE WARNINGS AND ALL INSTRUCTIONS BEFORE USING THIS PRODUCT!

**⚠ DANGER** SERIOUS BODILY INJURY OR DEATH CAN RESULT IF THIS PRODUCT IS NOT INSTALLED AND USED CORRECTLY.

**⚠ DANGER** THIS GRATE MUST ONLY BE INSTALLED AND USED WITH THE SUPPLIED PENTAIR WATER POOL AND SPA® FRAME OR WITH AN EXISTING PENTAIR POOL PRODUCTS® FRAME THAT IS IN GOOD CONDITION AND HAS INTACT BRASS INSERTS. THIS GRATE IS INCOMPATIBLE WITH ANY OTHER FRAME. IF THE POOL OR SPA HAS AN EXISTING FRAME (OTHER THAN ONE IN GOOD CONDITION WITH INTACT BRASS INSERTS MANUFACTURED BY PENTAIR POOL PRODUCTS OR AMERICAN PRODUCTS), THE EXISTING FRAME MUST FIRST BE REMOVED AND THE NEW SUPPLIED FRAME INSTALLED. DO NOT INSTALL THIS GRATE ON ANY OTHER STYLE OF FRAME OR ANOTHER MANUFACTURER'S FRAME. FAILURE TO FOLLOW THIS WARNING MAY RESULT IN A SUCTION ENTRAPMENT HAZARD AND CAN CAUSE LIMB AND BODY ENTRAPMENT OR EVISCERATION.

**⚠ WARNING** FOR USE WITH MULTIPLE SUCTION OUTLETS OR A SINGLE SUBMERGED SUCTION OUTLET. IF ONLY A SINGLE SUCTION OUTLET OR MAIN DRAIN EXISTS, A SAFETY VACUUM RELEASE SYSTEM (SVRS) SUCH AS THE PENTAIR WATER POOL AND SPA INTELLIFLO® VS+ SVRS PUMP, A GRAVITY DRAINAGE SYSTEM, AN AUTOMATIC SHUT-OFF SYSTEM OR A SUCTION-LIMITING VENT SYSTEM MUST BE USED.

**⚠ WARNING** IMPROPER INSTALLATION OR USE OF THIS PRODUCT MAY PRESENT A RISK OF HAIR OR BODY ENTRAPMENT AND DROWNING. INSTALL THIS EQUIPMENT IN ACCORDANCE WITH THE INSTRUCTIONS PROVIDED. USE ONLY WITH THE COMPONENTS AND MOUNTING HARDWARE PROVIDED. FAILURE TO FOLLOW THESE INSTRUCTIONS AND/OR USE WITH COMPONENTS NOT PROVIDED BY PENTAIR POOL PRODUCTS® AND INTENDED TO BE USED WITH THIS PRODUCT MAY RESULT IN IMPROPER POSITIONING OR FUNCTIONING OF DRAIN GRATE AND MAY CAUSE SEVERE PERSONAL INJURY OR DEATH.



**⚠ DANGER** SUCTION ENTRAPMENT HAZARD

Pool and spa pumps produce high levels of suction, which can pose extreme danger if a person comes in close proximity to an open pool or spa drain or if a drain grate is loose, cracked, broken or missing.

Pool and spa pumps move large volumes of water, which can pose extreme danger if a person's hair comes in close proximity to a drain that is not the proper size for the pump or pumps.

**Suction entrapment dangers include:**

**Hair Entanglement** – When the hair tangles or knots in the drain grate, trapping the swimmer underwater. This hazard is present when the flow rating of the grate is too small for the pump or pumps.

**Limb Entrapment** – When a limb is sucked or inserted into an opening resulting in a mechanical bind or swelling. This hazard is present when a drain grate is missing, broken, loose, cracked or not properly secured.

**Body Entrapment** – When a portion of the body is held against the drain grate trapping the swimmer underwater. This hazard is present when the drain grate is missing, broken or the grate flow rating is not high enough for the pump or pumps.

## WARNINGS AND IMPORTANT SAFETY PRECAUTIONS

**Evisceration/Disembowelment** – When a person sits on an open pool (particularly a child wading pool) or spa outlet and suction is applied directly to the intestines, causing severe intestinal damage. This hazard is present when the drain grate is missing, loose, cracked, or not properly secured.

**Mechanical Entrapment** – When jewelry, swimsuit, hair decorations, finger, toe or knuckle is caught in an opening of an outlet or drain grate. This hazard is present when the drain grate is missing, broken, loose, cracked, or not properly secured.

**⚠ WARNING** Use these fittings only with a pumping system rated for the corresponding flow or less for two (2) inch plumbing (see sump diagram on page 4). **FAILURE TO DO SO CAN RESULT IN HAIR OR BODY ENTRAPMENT WHICH CAN CAUSE SEVERE PERSONAL INJURY OR DEATH.** If in doubt about the rating of your system, consult a qualified pool or spa professional.

### IMPORTANT NOTICE

**Regularly inspect all drain grates for cracks, damage and advanced weathering. If a drain grate becomes loose, cracked, damaged, broken or is missing, close the pool or spa immediately, post a notice and keep the pool or spa closed until an appropriate VGB 2008 certified drain grate is properly installed. Drain grates deteriorate over time due to exposure to sunlight and pool chemicals. This drain grate must be replaced within seven (7) years from installation (or earlier if the grate becomes damaged in any way).**

**⚠ WARNING** An ANSI/ASME A112.19.8a approved anti-entrapment drain grate must be used for each drain. Pools and spas should utilize two drains per pump. If a drain grate becomes loose, broken or is missing, close the pool or spa immediately and shut off the pump until an approved anti-entrapment drain grate is properly installed with the supplied stainless steel screws. Only the supplied 316 stainless-steel screws should be used with the drain grate. Substitute screws such as masonry screws, sheet rock screws or other types of screws should never be used. Screws put into the frame anywhere except in the original screw holes will not hold and will allow the drain grate to come off the main drain, causing an entrapment hazard, including possible limb and body entrapment or evisceration/disembowelment. If the screw holes of the frame are stripped or the brass inserts are missing, loose, or damaged, replace the frame. **DO NOT DRILL NEW SCREW HOLES IN THE FRAME AS THIS WILL DAMAGE AND WEAKEN THE FRAME.**



### IMPORTANT NOTICE

**Attention Installer:** This manual contains important information about the installation, operation and safe use of this product. This information should be given to the owner and/or operator of this equipment. Please refer to [www.pentair.com](http://www.pentair.com) for all warnings and instructions related to the StarGuard® Square Drain.

**⚠ WARNING** Before installing this product, read and follow all warning notices and instructions which are included. Failure to follow safety warnings and instructions can result in severe injury, death, or property damage. Call (800) 831-7133 for additional free copies of these instructions. It is absolutely critical that the suction plumbing be installed in accordance with the latest national and local codes for swimming pools.

**⚠ DANGER** A pool/spa pump produces high levels of suction, which can pose extreme danger if a person comes in close proximity to an open pool or spa drain or a loose or broken drain grate.

### Hydrostatic relief valve

For installations utilizing a hydrostatic relief valve, using a collector tube will maintain a clear path to the hydrostatic valve. At least one hydrostatic relief valve in a set of suction outlets will allow hydrostatic uplift pressure caused by ground water to be relieved into the pool or spa.

## WARNINGS AND IMPORTANT SAFETY PRECAUTIONS

### Entrapment Avoidance Notice:

The grates used on suction outlets should be approved and listed as conforming to the currently published edition of ASME/ANSI A112.19.8a Standard. These grates should be inspected regularly and replaced if cracked, broken or older than the design lifetime indicated on them by the manufacturer. The maximum possible flow rate of the pump should be less than or equal to the maximum approved flow rate indicated on the suction outlet grate by the manufacturer. **THE USE OF UNAPPROVED GRATES OR ALLOWING USE OF THE POOL OR SPA WHEN GRATES ARE MISSING, CRACKED OR BROKEN CAN RESULT IN BODY OR LIMB ENTRAPMENT, HAIR ENTANGLEMENT, EVISCERATION AND DEATH.**

**⚠ WARNING** Pumps improperly sized or installed or used in applications other than for which the pump was intended can result in severe personal injury or death. These risks may include but not be limited to electric shock, fire, flooding, suction entrapment or severe injury or property damage caused by a structural failure of the pump or other system component.

**⚠ WARNING** The use of alcohol, drugs, or medication can greatly increase the risk of fatal hyperthermia in hot tubs and spas.

**⚠ WARNING** To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.

**⚠ WARNING** When setting up pool water turnovers or flow rates the operator must consider local codes governing turnover as well as disinfectant feed ratios.

**⚠ WARNING** DO NOT increase pump size; this will increase the flow rate through the system and exceed the maximum flow rate stated on the drain grate.

## WARNINGS AND IMPORTANT SAFETY PRECAUTIONS

**⚠ WARNING** Most states and local codes regulate the construction, installation, and operation of public pools and spas, and the construction of residential pools and spas. It is important to comply with these codes, many of which directly regulate the installation and use of this product. Consult the local building and health codes for more information.

- Dual suction fittings shall not be located on seating areas or on the back rests for such seating areas.
- If the pool or spa has only a single suction outlet or main drain, a Safety Vacuum Release System (SVRS) such as the Pentair Water Pool and Spa IntelliFlo® VS+SVRS pump, a gravity drainage system, an automatic shut-off system or a suction-limiting vent system **MUST** be used.
- In the event one suction outlet is completely blocked, the remaining suction outlets serving the system shall have a flow rating capable of the full flow of the pump(s) for the specific system.
- An approved anti-entrapment suction outlet grate must be used for each drain.
- Never exceed the maximum flow rate stated on the drain grate.
- Before each use of the facility the suction fitting, including fasteners, should be inspected for damage or tampering.
- Close the pool or spa if any suction outlet component is loose, cracked, broken, missing or not securely attached. Replace loose, cracked, damaged, broken or missing drain grates.
- In addition to two or more suction outlets per pump (Figure 2) installed in accordance with the latest APSP standards and CPSC guidelines, follow all applicable national, state and local codes.
- The suction outlet to a swimming pool pump pulls a high vacuum. If pump is used with only one suction pipe, anyone blocking pump suction with hair or body will be trapped and held against the suction fitting. Disembowelment or drowning can result.
- To prevent entrapment, install at least two suction outlet (main drains) fittings per pump in pool. Separate these outlets by either of the following procedures.
  - A. Locate the outlets at least three (3) feet apart.
  - B. Locate the outlets in two (2) different planes (Figure 1), (for example, one on the bottom and one on a vertical side wall, or on two separate vertical side walls). Use multiple suction sources to reduce risk of entrapment. Failure to maintain fittings and grates can lead to severe injury or death. Use of fittings when grates are broken, loose or missing can lead to severe injury or death. If using 1½ in. plumbing. Consult your local building dept. for codes or ordinances that may apply.
- Remove the pressure test plugs and/or plugs used in winterization of the pool/spa from the suction outlets.

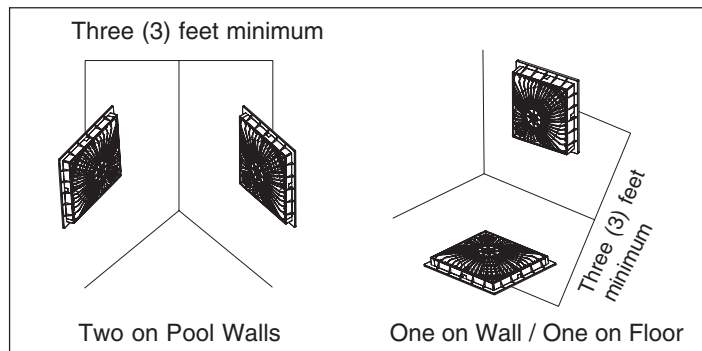


Figure 1: Alternate Location for Suction Outlets

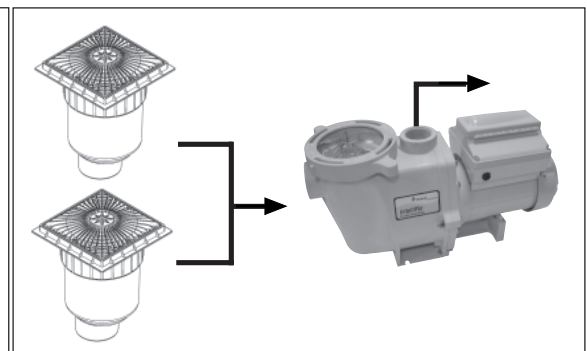


Figure 2: Two Suction Outlets per Pump

If you have any questions about installation or maintenance of this drain grate, please contact your pool professional. Never attempt to alter or repair the grate or frame on your own.

## VIRGINIA GRAEME BAKER POOL AND SPA SAFETY ACT

**The Virginia Graeme Baker Pool and Spa Safety Act** raises certain new requirements on owners and operators of swimming pools and spas.

Pools or spas constructed on or after December 19, 2008, shall utilize:

- (A) A multiple main drain system without isolation capability with suction outlet covers that meet ASME/ANSI A112.19.8a Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, and Hot Tubs and either:
  - (i) A safety vacuum release system (SVRS) meeting ASME/ANSI A112.19.17 Manufactured Safety Vacuum Release Systems (SVRS) for Residential and Commercial Swimming Pool, Spa, Hot Tub, and Wading Pool Suction Systems and/or ASTM F2387 Standard Specification for Manufactured Safety Vacuum Release Systems (SVRS) for Swimming Pools, Spas and Hot Tubs or
  - (ii) A properly designed and tested suction-limiting vent system or
  - (iii) An automatic pump shut-off system.

Pools and spas constructed prior to December 19, 2008, with a single submerged suction outlet shall use a suction outlet cover that meets ASME/ANSI A112.19.8a and either:

- (A) A safety vacuum release system (SVRS) meeting ASME/ANSI A112.19.17 and/or ASTM F2387, or
- (B) A properly designed and tested suction-limiting vent system, or
- (C) An automatic pump shut-off system, or
- (D) Disabled submerged outlets, or
- (E) Suction outlets shall be reconfigured into return inlets.

**For more information about the Virginia Graeme Baker Pool and Spa Safety Act, contact the Consumer Product Safety Commission at (301) 504-7908 or visit [www.cpsc.gov](http://www.cpsc.gov).**

**NOTE: Always turn off all power to the pool pump before installing the cover or working on any suction outlet.**



## ACTS CODES AND STANDARDS

### Important Acts Codes and Standards Information

StarGuard® and all suction outlet fittings (drain grates) are federally regulated by the U.S. Consumer Product Safety Commission (CPSC). This authority was given to the CPSC in 2007 as part of the Virginia Graeme Baker Pool and Spa Safety Act. Visit [www.cpsc.org](http://www.cpsc.org) for more information.

#### ASME/ANSI A112.19.8a Certification

These suction fittings, for use in swimming pools, wading pools, spas and hot tubs, were tested and certified to the aforementioned safety regulations, by IAPMO Research and Testing, 5001 E. Philadelphia St. Ontario, CA 91761 – USA 877-4UPCMARK (toll free). Product certification commenced April 2009, test results can be obtained from: [www.pentairwater.com](http://www.pentairwater.com) and/or <http://pld.iapmo.org/>

#### NSF/ANSI-50

StarGuard® is certified to comply with NSF/ANSI 50 Circulation system components and related materials for swimming pools, spas/hot tubs. To download a current copy of the NSF certification, go to <http://pld.iapmo.org>

#### Virginia Graeme Baker Pool and Spa Safety Act

StarGuard® is certified to comply with the Virginia Graeme Baker Pool and Spa Safety Act, Section 1404(b). This section requires all suction outlet fittings (drain grates) to conform to ANSI/ASME A112.19.8a.

#### International Code Council

StarGuard® is an approved component as required by the International Code Council (ICC) building codes, which include the International Residential Code (IRC), and the International Building Code (IBC), collectively known as the iCodes. The ICC updates the iCodes every three years. For more information, visit [www.iccsafe.org](http://www.iccsafe.org).

#### International Residential Code (IRC)

Many states and local jurisdictions have adopted the IRC, including Appendix G. Section AG106 addresses Suction Entrapment Avoidance requirements that regulate residential swimming pools and spas. It is important to know if these codes are in effect where the residential pool or spa is being built and which version is being required. Effective in the 2009 version of the IRC is the requirement to build in accordance with ANSI/APSP 7 - 2006 American National Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins. 2003 and 2006 versions do not include a reference to the ANSI/APSP 7 standard, instead they included the requirement that all pools and spas be equipped with dual-drains and a vacuum relief system that can be either an Approved Gravity Drainage System, or a Safety Vacuum Release System (SVRS) such as the IntelliFlo® VS+ SVRS pump. Visit [www.iccsafe.org](http://www.iccsafe.org) for more information.

#### International Building Code (IBC)

Many states and local jurisdictions have adopted the International Building Code which regulates commercial building projects, including public swimming pools and spas. Section 3109.5 addresses Suction Entrapment Avoidance requirements that regulate public swimming pools and spas. It is important to know if these codes are in effect where the public pool or spa is being built and which version is being required. Effective in the 2009 version of the IBC is the requirement to build in accordance with ANSI/APSP 7 - 2006 American National Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins. 2003 and 2006 versions do not include a reference to the ANSI/APSP 7 standard, instead they included the requirement that all pools and spas be equipped with dual-drains and a vacuum relief system that can be either an Approved Gravity Drainage System, or a Safety Vacuum Release System (SVRS) such as the IntelliFlo® VS+ SVRS pump. Visit [www.iccsafe.org](http://www.iccsafe.org) for more information.

#### ANSI/APSP-7 Suction Entrapment Avoidance Standard

The Association of Pool and Spa Professionals publishes many swimming pool and spa related standards, including ANSI/APSP 7 - 2006 American National Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins. ANSI/APSP 7 is referenced by the iCodes, and is required by some states and local jurisdictions. It requires all suction outlet fittings (drain grates) to be tested and Listed by a nationally recognized testing laboratory as conforming to most recent version of ASME/ANSI A112.19.8a. Visit [www.apsp.org](http://www.apsp.org) for more information.

# Hydraulic System Specifications

## POOL PUMP SUCTION REQUIREMENTS

Pump suction is hazardous and can trap and drown or disembowel bathers. Do not use or allow anyone else to use a pool, spa, or hot tub unless it has at least two (2) suction outlets to each pump suction line (see Figure 1, Outlets Per Pump, below). Do not use or operate swimming pools, spas, or hot tubs if a suction outlet grate is missing, broken, or loose. Follow the guidelines below for a pump installation which minimizes risk to users of pools, spas, and hot tubs.

### Entrapment Protection

The pump suction system must provide protection against the hazard of suction entrapment or hair entrapment/entanglement.

### Suction Outlet Grates

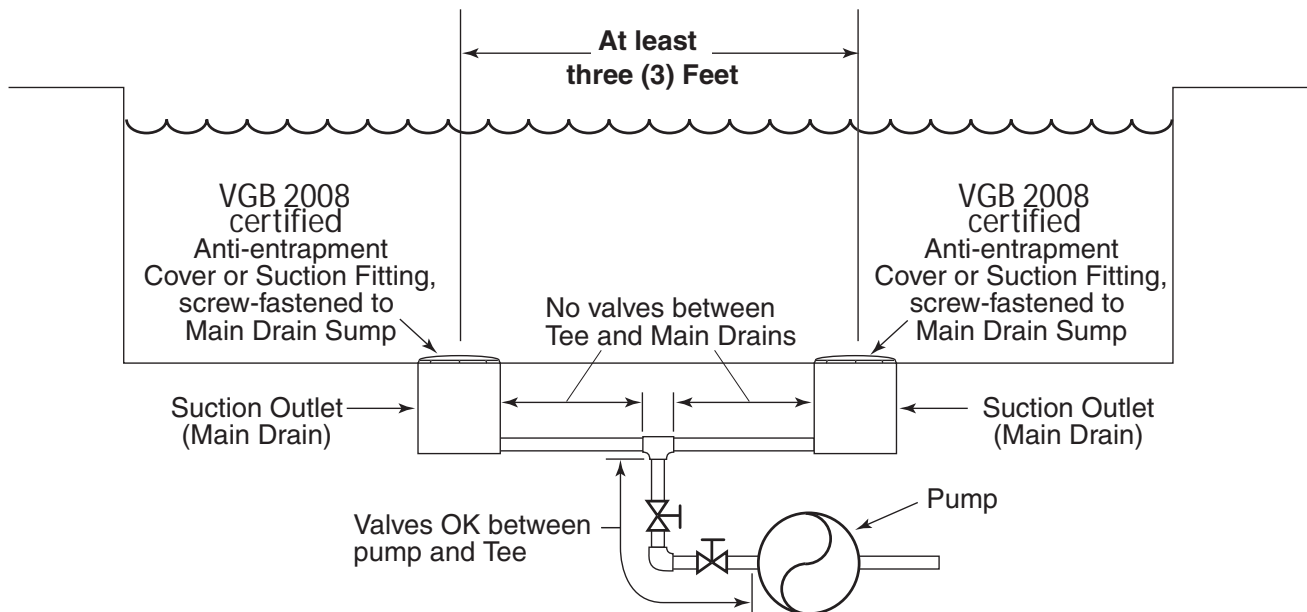
All suction outlet grates must be maintained. They must be replaced if cracked, broken, or missing. See page vii for outlet grate certification requirements. All suction outlets must have correctly installed, screw-fastened grates in place.

### Outlets Per Pump

Provide at least two (2) hydraulically balanced main drains, with grates (see Figure 1), for each swimming pool pump suction line. The centers of the main drains (suction fittings) must be at least three (3) feet apart.

The system must be built so that it cannot operate with the pump drawing water from only one (1) main drain (that is, there must be at least two (2) main drains connected to the pump whenever it is running, see Figure 1). However, if two (2) main drains run into a single suction line, the single suction line may be equipped with a valve which will shut off both main drains from the pump (see Figure 1).

For existing single drain pools and spas, or multiple main drains located less than three feet (3) apart, a backup system must be installed, such as the IntelliFlo® VS +SVRS. Other backup systems include, approved gravity draining systems, or suction-limiting vent.



**Figure 1: Outlets Per Pump**

### Water Velocity and Flow Rates

The maximum water velocity through drain grates is limited by some local regulations, for example some state health departments limit the velocity through public pool drain grates to 1-1/2 feet per second. This velocity limit is lower than the flow rating provided by the ASME/ANSI A112.19.8a certification, therefore local limit applies and must be followed. Never exceed the flow rating listed on the grate even if local code does not provide a velocity limit (see Chart 2 on page 2).

## Piping – General

For new installations, the piping between drains must be sized to limit the velocity to six (6) feet per second. This limit applies to the branch piping and all fittings between multiple outlets and the tee leading back to the pump. If code requires a lower water velocity, comply with the code. See Chart 1 for information on pipe size flow ratings at six (6) feet per second.

### Acceptable Pipe Size for Maximum Recommended System Flow Rate Per APSP-7 (6 ft./sec inch the Branch Line)

CHART 1	
Pipe Size Inch (mm)	Flow Rate GPM (L/Min.)
1-1/2" (50)	37 (140)
2" (63)	62 (233)
2-1/2" (75)	88 (332)
3" (90)	136 (514)

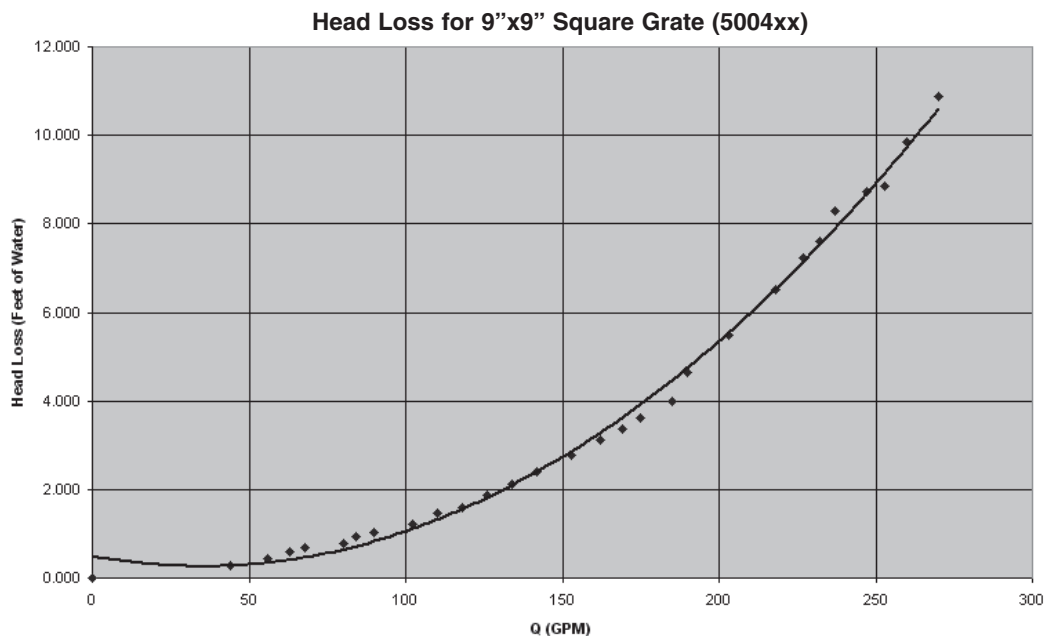
### StarGuard® Square Drain Gallons Per Minute (GPM) Ratings

CHART 3			
Part No.	Open Area	Flow Rating Floor	Flow Rating Wall
5004XX	38.70 in <sup>2</sup>	270 GPM	270 GPM
5005XX	76.00 in <sup>2</sup>	360 GPM	360 GPM
5006XX	154.80 in <sup>2</sup>	740 GPM	740 GPM
5007XX	304.00 in <sup>2</sup>	1428 GPM	1428 GPM

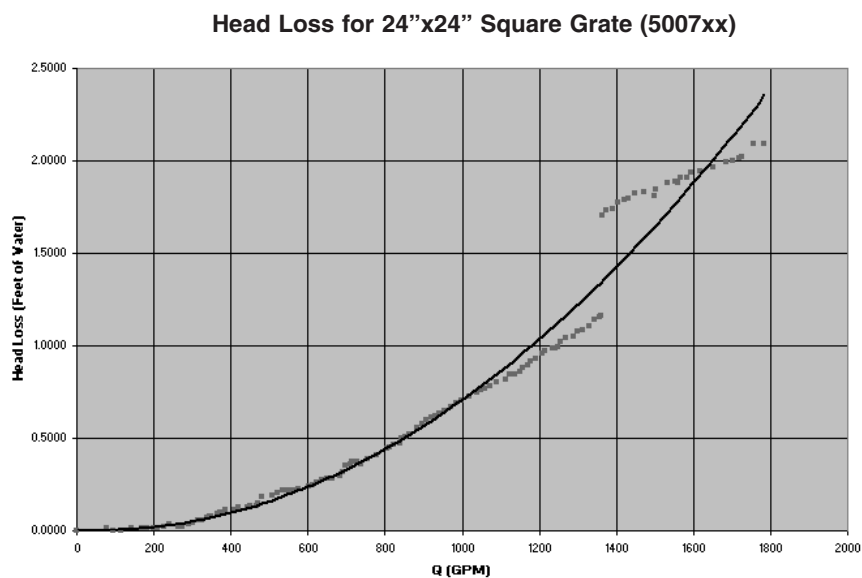
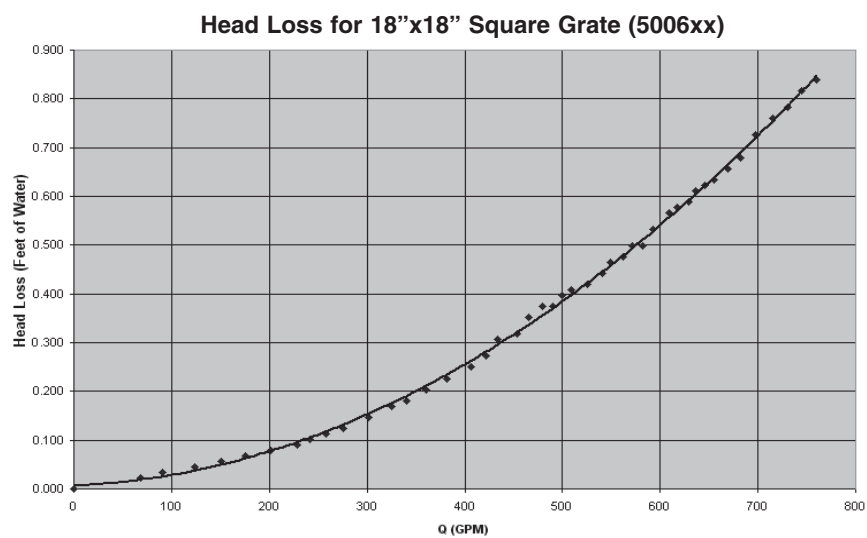
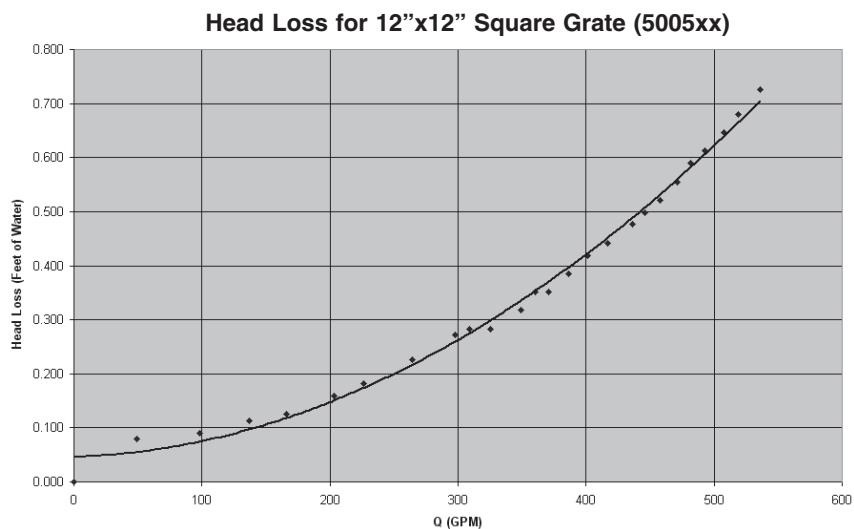
### Flowrate based on Open Area and Velocity $Q=AV$

CHART 2				
Velocity ft/sec. (V)	Open Area (A) 38.70 in. <sup>2</sup>	Open Area (A) 76.00 in. <sup>2</sup>	Open Area (A) 154.80 in. <sup>2</sup>	Open Area (A) 304.00 in. <sup>2</sup>
	Flow GPM (Q)	Flow GPM (Q)	Flow GPM (Q)	Flow GPM (Q)
1.0	120.6	236.8	482.5	947.5
1.5	180.9	355.3	723.7	1421.3
2.0	241.2	473.7	965.0	1865.0
2.5	301.5	592.2	1206.2	2368.8
3.0	361.8	710.6	1447.5	2842.6
3.5	422.2	829.1	1688.7	3316.3
4.0	482.5	947.5	1929.9	3790.1
4.5	542.8	1065.9	2171.2	4263.9
5.0	603.1	1184.4	2412.4	4737.6
5.5	663.4	1302.8	2653.7	5211.4
6.0	723.7	1421.3	2894.9	5685.2

### StarGuard Square Grate Pressure Drop Curve (Head Loss)



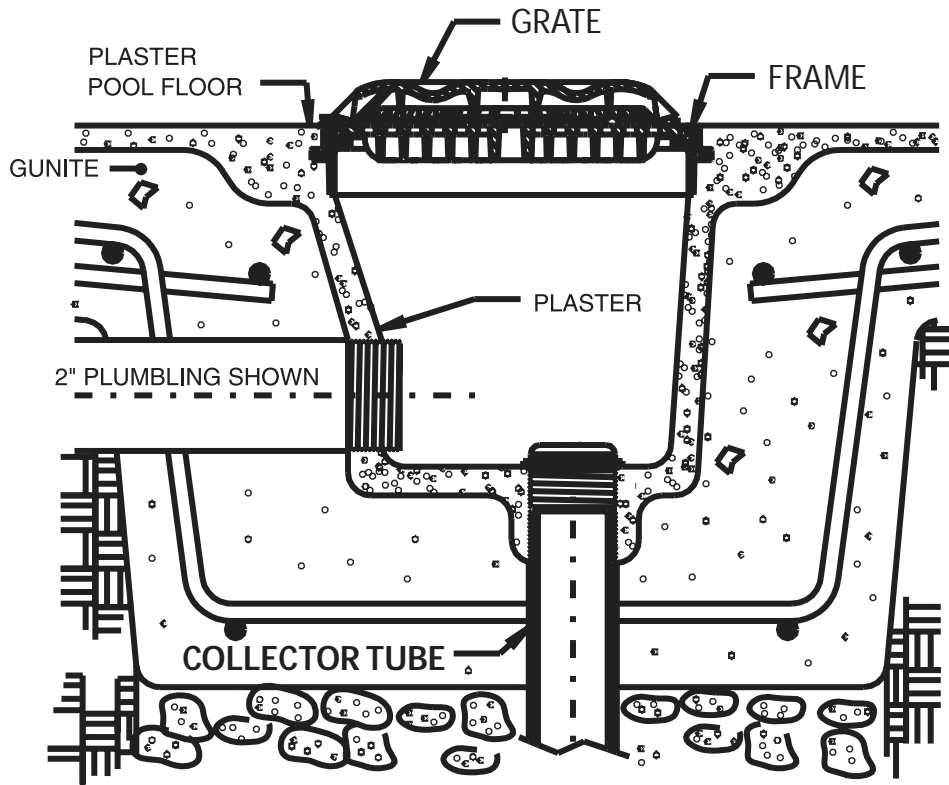
## StarGuard Square Grate Pressure Drop Curve (Head Loss)



## Section 1

### Field Fabricated Sump Installation

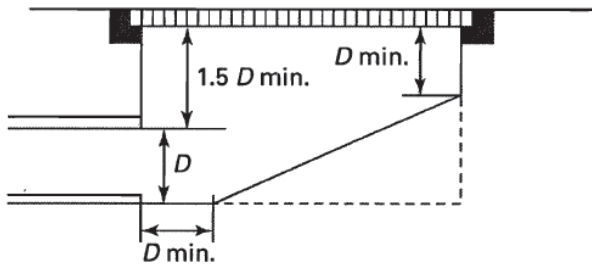
The following describes the installation requirements and procedure for a new field fabricated sump. For the StarGuard Square Drain Installation, see page 5.



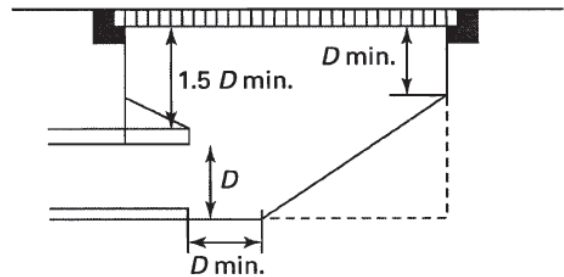
Field Fabricated Sump Installation Diagram

### Field Fabricated Sump Specifications for Dual Submerged Suction Outlet

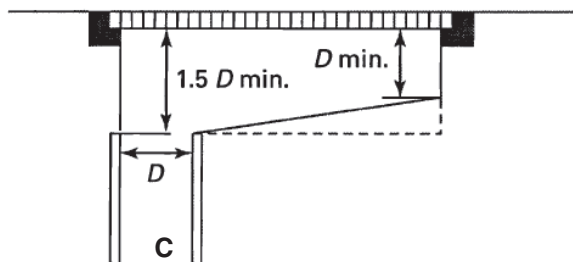
Field fabricated sumps must be built in accordance with the specifications shown in diagrams below.



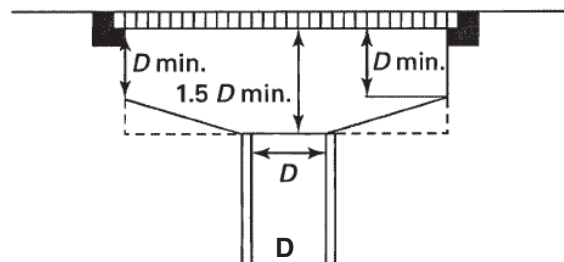
A



B



C



D

Note: A)  $D$  = inside pipe diameter. B) All dimensions shown are minimum measurements. C) A broken line (-----) indicates suggested sump configuration.

## Section 2

### StarGuard® Square Frame and Grate Installation

The following describes how to install a frame and grate or a replacement frame and grate for a field fabricated or manufacturers sump with an acceptable frame.

For the StarGuard Square Drain New Grate Installation, see page 5.

For the StarGuard Square Drain Replacement Grate Installation, see page 6.

#### Model Description

500400 9"x9" StarGuard® Square Frame and Grate, Wht.	500600 18"x18" StarGuard® Square Frame and Grate, Wht.
500401 9"x9" StarGuard® Square Frame and Grate, Blk.	500601 18"x18" StarGuard® Square Frame and Grate, Blk.
500500 12"x12" StarGuard® Square Frame and Grate, Wht.	500700 24"x24" StarGuard® Square Frame and Grate, Wht.
500501 12"x12" StarGuard® Square Frame and Grate, Blk.	500701 24"x24" StarGuard® Square Frame and Grate, Blk.

### New Frame and Grate Installation

To install the frame and grate:

- ⚠ WARNING** ONLY USE THE 316 STAINLESS STEEL 10-32 MACHINE SCREWS PROVIDED. SUBSTITUTE SCREWS SUCH AS MASONRY SCREWS, SHEET ROCK SCREWS OR OTHER TYPES OF SCREWS SHOULD NEVER BE USED, WILL CAUSE THE GRATE TO COME LOOSE AND COULD RESULT IN LIMB OR BODY ENTRAPMENT, HAIR ENTANGLEMENT OR EVISCERATION/DISEMBOWELMENT.

**⚠ WARNING** BEFORE INSTALLING THIS PRODUCT, INSTALLERS, POOL OPERATORS AND POOL OWNERS MUST READ AND UNDERSTAND ALL WARNINGS AND SAFETY PRECAUTIONS SET FORTH ON PAGES ii-vii AND PAGES 1-2 OF THIS INSTALLATION GUIDE.

**⚠ WARNING** IF THE FRAME, SCREW, SUMP OR SCREW HOLES ARE DAMAGED IN ANY WAY THAT PREVENTS COMPLETE INSERTION OF THE SPECIFIED SCREW, THE FRAME, SUMP OR DAMAGED SCREW MUST BE REPLACED. DO NOT ATTEMPT TO MODIFY OR ALTER ANY COMPONENT IN ANY WAY.
- If you are installing a 24"x24" metal frame, the frame must be connected to the pool bond circuit. Refer to **Section 2, Ground Bonding for New 24"x24" Frame and Grate Installation** on page 7.
- Install the frame onto the suction outlet in accordance with: **Section 1, Field Fabricated Sump Installation diagram, page 4.**
- Seat the drain grate inside the frame on top of the suction outlet (see Figure 1).
- Install the four (4) 316 stainless steel 10-32 machine screws (provided) for the 9"x9" and 12"x12" grate (16 screws for the 18"x18" and 24"x24" grate) into the holes in the top of the grate. Using a No. 2 Philips head screwdriver, tighten each retaining screw to a **torque value of 10.00 (minimum) to 15.0 (maximum) in-lbs** to secure the grate. DO NOT OVER TIGHTEN THE SCREWS. DO NOT ASSEMBLE WITH POWER TOOLS.

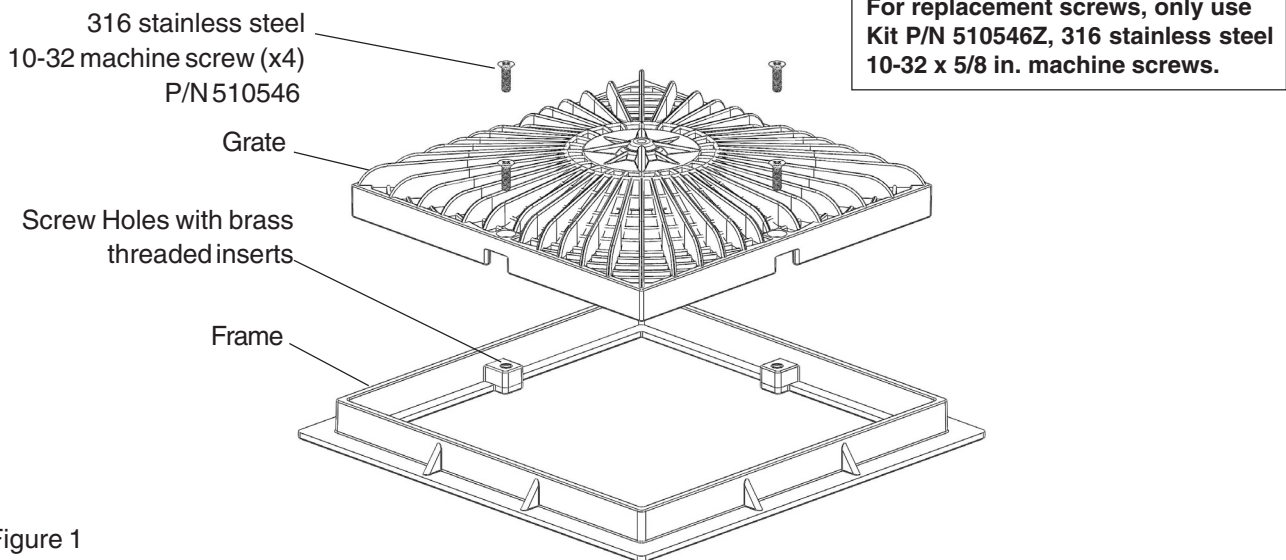


Figure 1



## Replacement StarGuard® Square Frame and Grate Installation

**⚠ DANGER** When replacing the grate on a previously installed drain without brass threaded inserts, only use replacement thread forming screws (P/N 510549Z) provided.

**⚠ WARNING** THESE REPLACEMENT INSTRUCTIONS ONLY APPLY TO 9"X9" AND 12"X12' GRATES. TO REPLACE 18"X18" AND 24"X 24" GRATES REQUIRES A NEW FRAME WITH BRASS INSERTS.

To replace the grate:

- ⚠ WARNING** IF THE EXISTING GRATE HAS A FRAME WITHOUT BRASS THREADED INSERTS, IT IS RECOMMENDED THAT YOU REPLACE THE EXISTING FRAME WITH A NEW FRAME WITH BRASS THREADED INSERTS.

**⚠ WARNING** BEFORE INSTALLING THIS PRODUCT, INSTALLERS, POOL OPERATORS AND POOL OWNERS MUST READ AND UNDERSTAND ALL WARNINGS AND SAFETY PRECAUTIONS SET FORTH ON PAGES ii-vii AND PAGES 1-2 OF THIS INSTALLATION

**⚠ WARNING** ONLY USE THE 316 STAINLESS STEEL 10-14 THREAD FORMING SCREWS (SEE FIG. 2) PROVIDED. SUBSTITUTE SCREWS SUCH AS MASONRY SCREWS, SHEET ROCK SCREWS OR OTHER TYPES OF SCREWS SHOULD NEVER BE USED, WILL CAUSE THE GRATE TO COME LOOSE AND COULD RESULT IN LIMB OR BODY ENTRAPMENT, HAIR ENTANGLEMENT OR EVISCERATION/DISEMBOWELMENT.

**⚠ WARNING** IF THE FRAME, SUMP, SCREW OR SCREW HOLES ARE DAMAGED IN ANY WAY THAT PREVENTS COMPLETE INSERTION OF THE SPECIFIED SCREW, THE FRAME, SUMP OR DAMAGED SCREW MUST BE REPLACED. DO NOT ATTEMPT TO MODIFY OR ALTER ANY COMPONENT IN ANY WAY.
- Remove the existing drain cover and discard.
- Seat the drain grate inside the frame on top of the suction outlet (see Figure 3).
- Install the four (4) 316 stainless steel 10-14 thread forming screws (provided) into the holes in the top of the grate. Using a No. 2 Philips head screwdriver, tighten each retaining screw to a **torque value of 10.00 (minimum) to 15.0 (maximum) in-lbs** to secure the grate. DO NOT OVER TIGHTEN THE SCREWS. DO NOT ASSEMBLE WITH POWER TOOLS.

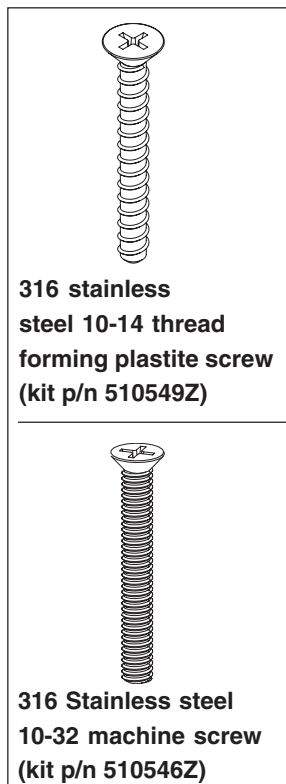


Figure 2

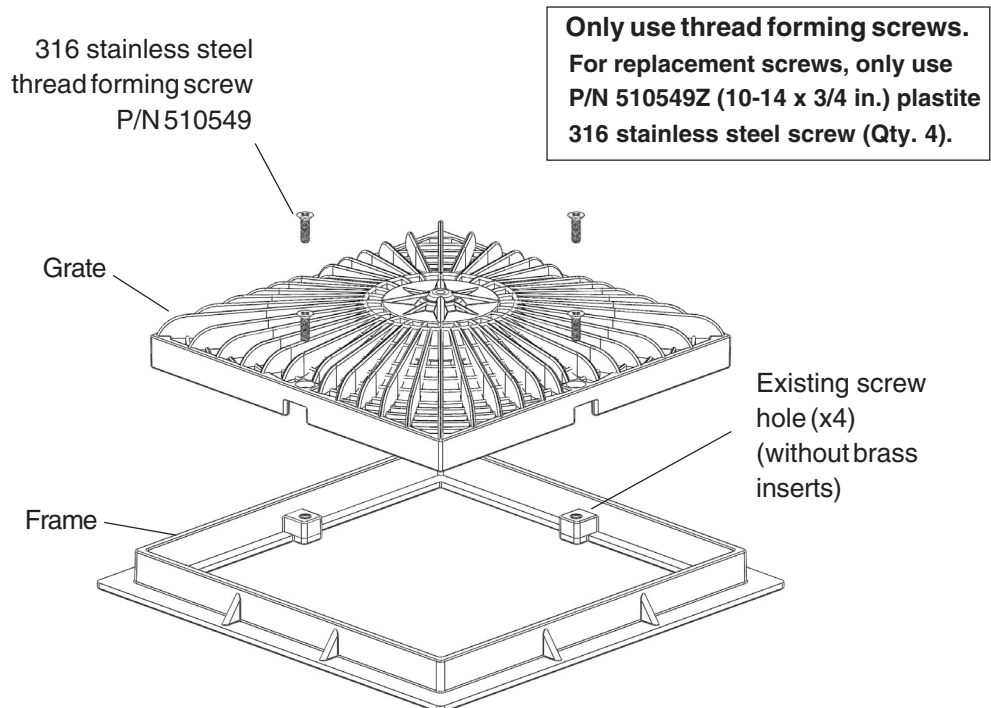


Figure 3

## Ground Bonding for New 24"x24" Frame and Grate Installation

### **⚠ DANGER**



**DANGER RISK OF ELECTRICAL SHOCK OR ELECTROCUTION WARNING** - This product must be installed by a licensed or certified electrician or a qualified pool professional in accordance with the National Electrical Code and all applicable state and local codes and ordinances. Improper installation will create an electrical hazard which could result in death --- or serious injury to pool users, installers or others due to electrical shock, and may also cause damage to property. **READ AND FOLLOW ALL INSTRUCTIONS.**

To install the ground bonding to the 24"x24" metal frame :

1. Connect the bonding wire from rebar and bonding grid to the bonding lug on the bottom of the frame (see figure 1).
2. Bond the frame using No. 8 AWG bond wire by inserting the wire into the lug hole on the bottom of the frame. Secure the wire using the provided 1/4-20 316 stainless steel bolt.

For replacement lug bolt use  
Kit P/N 540119Z.

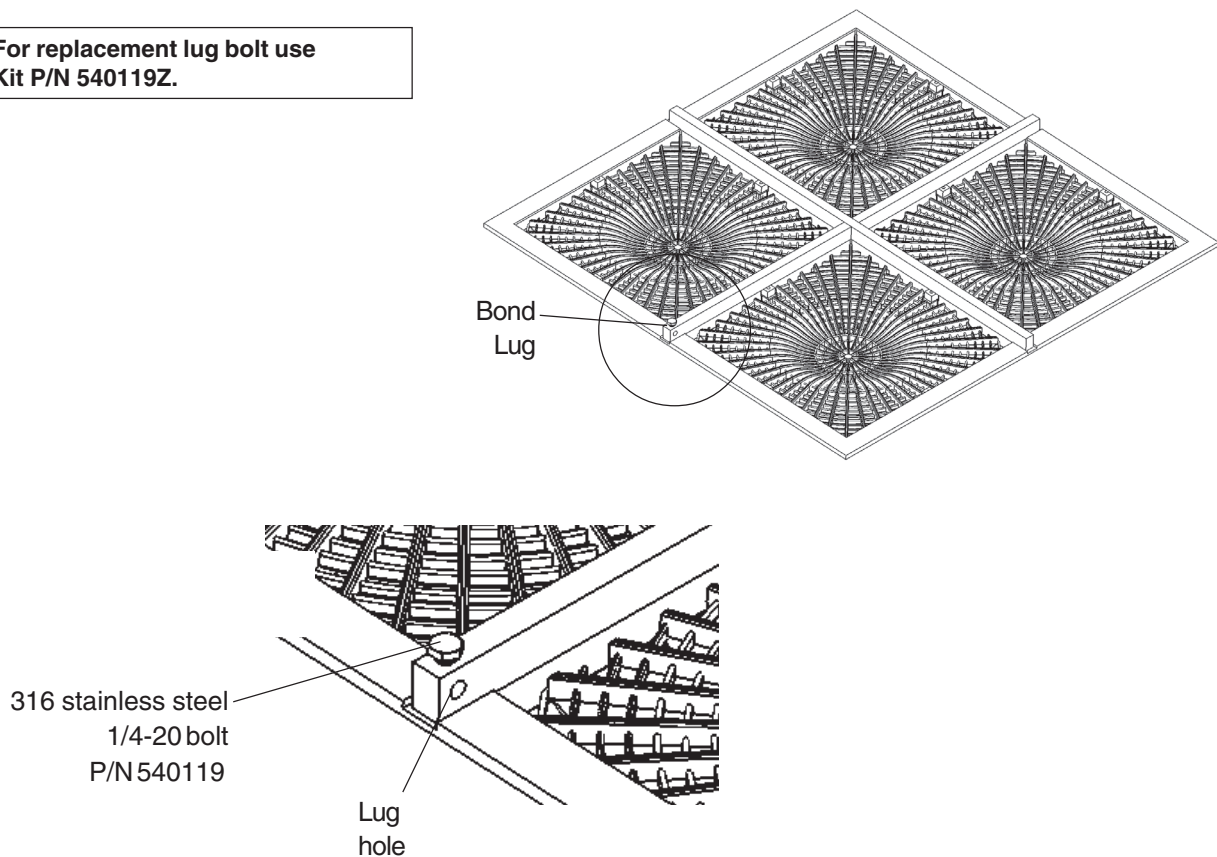
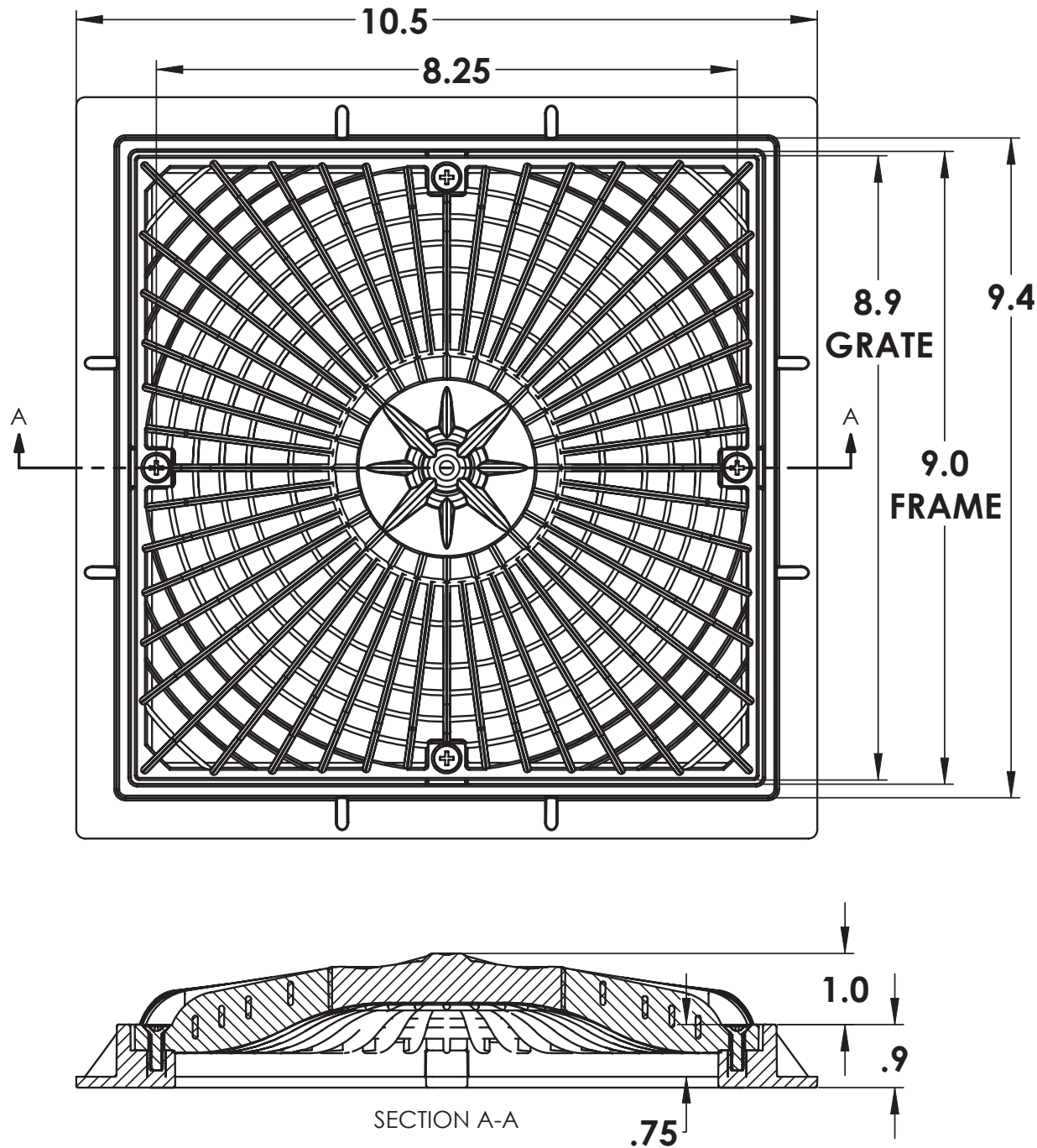
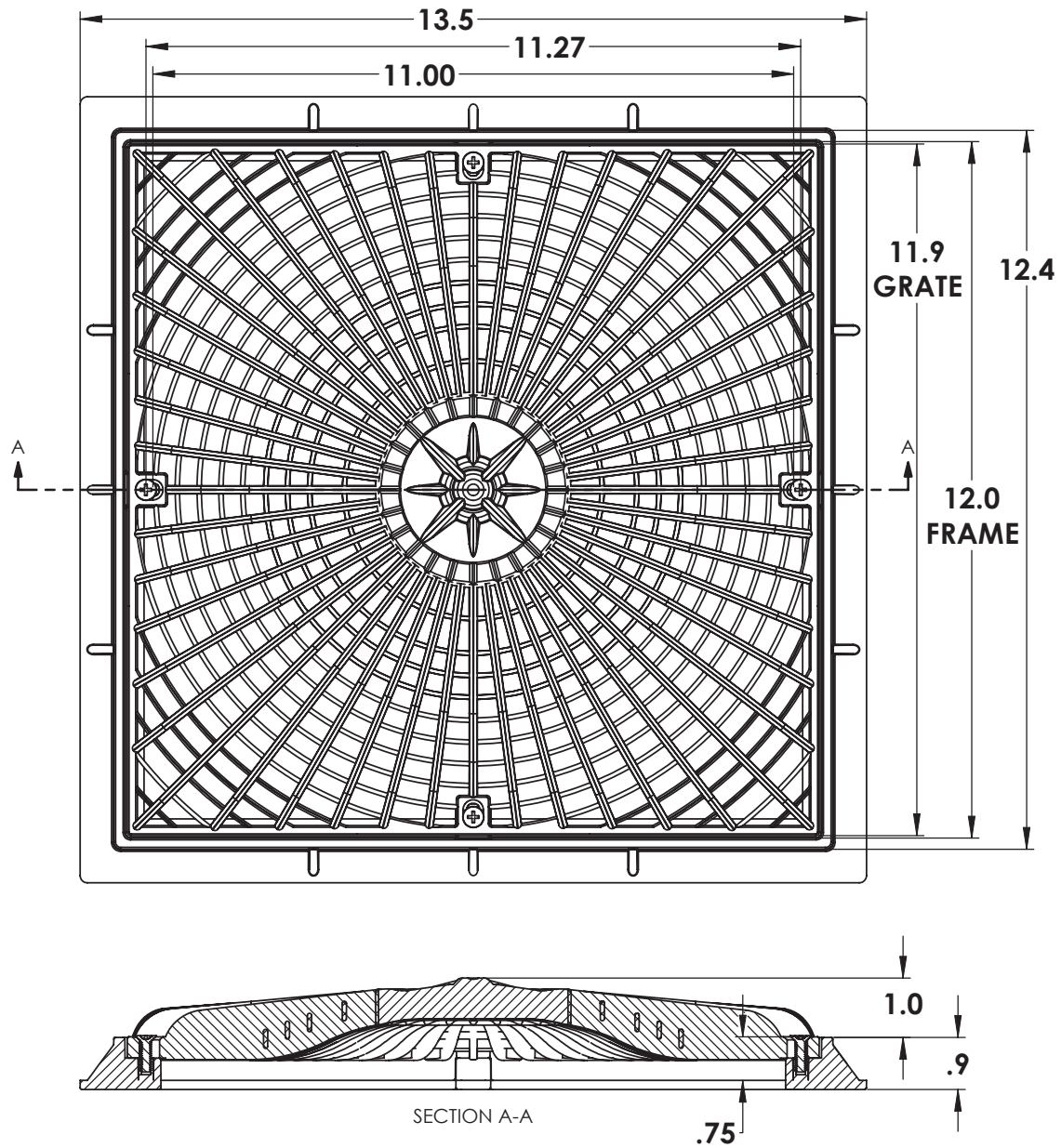


Figure 1

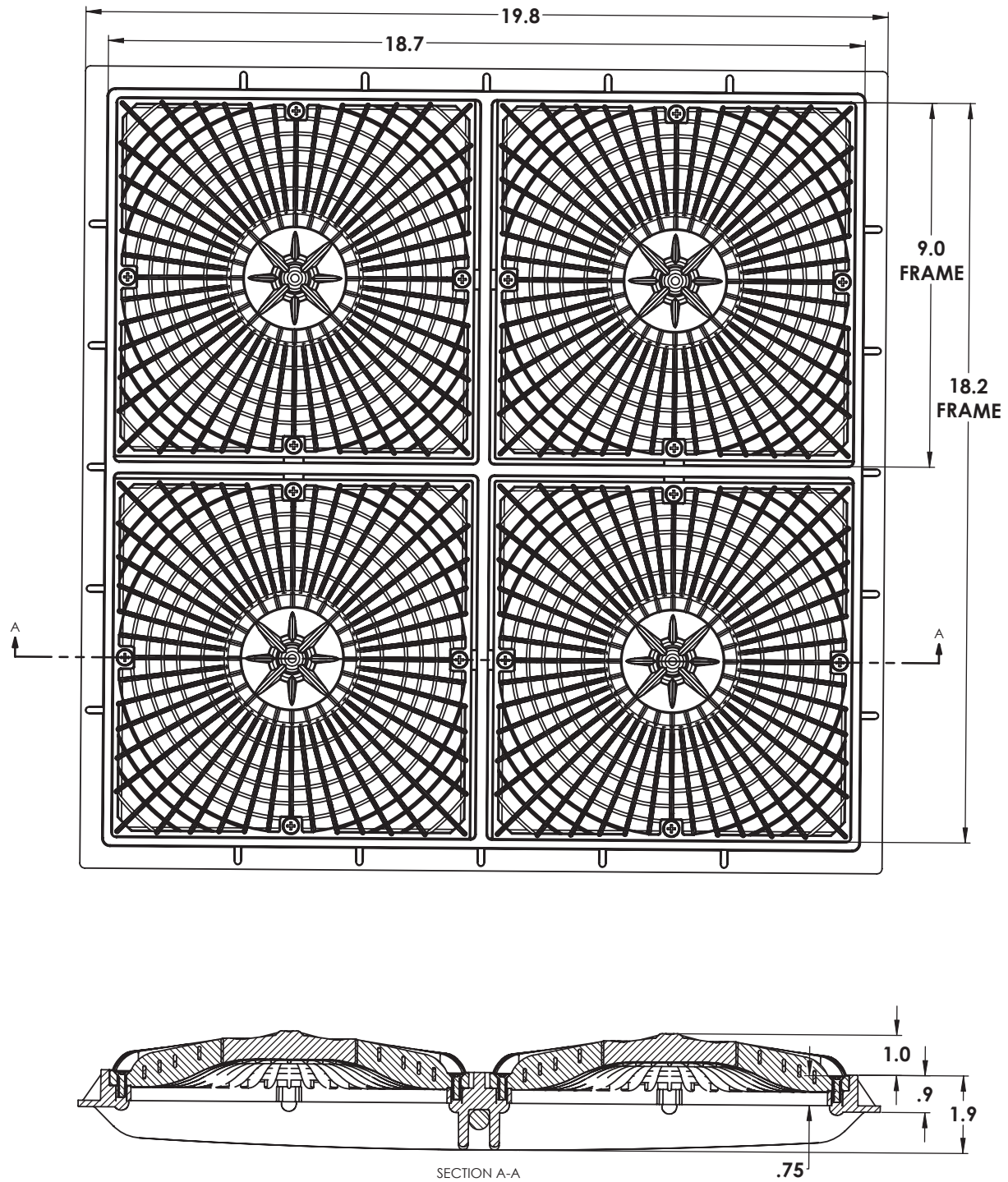


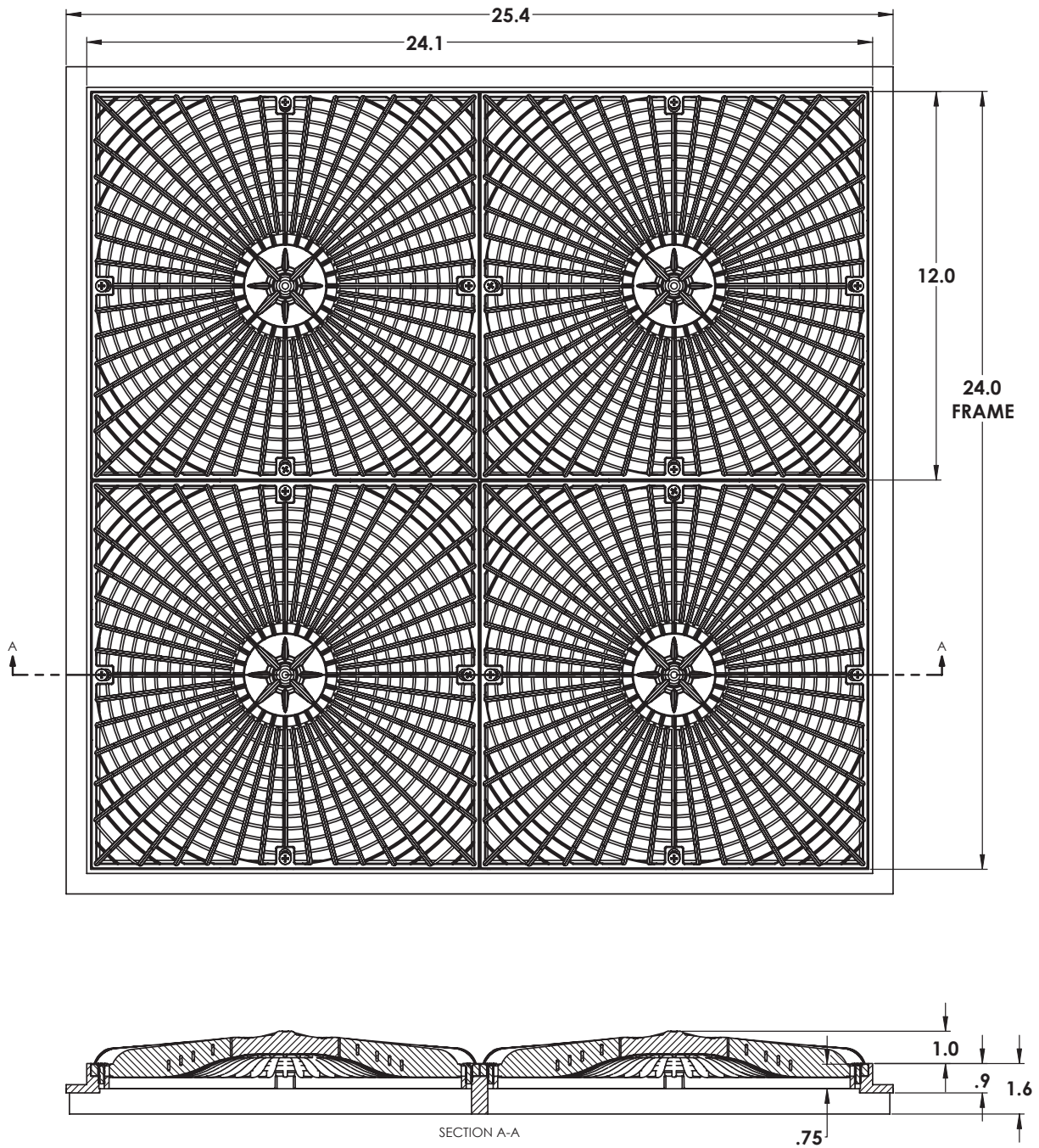
Dimensions (9"x9") StarGuard® Square Frame and Grate (500400 -500409)



**Dimensions (12"x12") StarGuard® Square Frame and Grate (500500 - 500509)**

## Dimensions (18"x18") StarGuard® Square Frame and Grate (500600 -500609)



**Dimensions (24"x24") StarGuard® Square Frame and Grate (500700 -500709)**



## Section 3

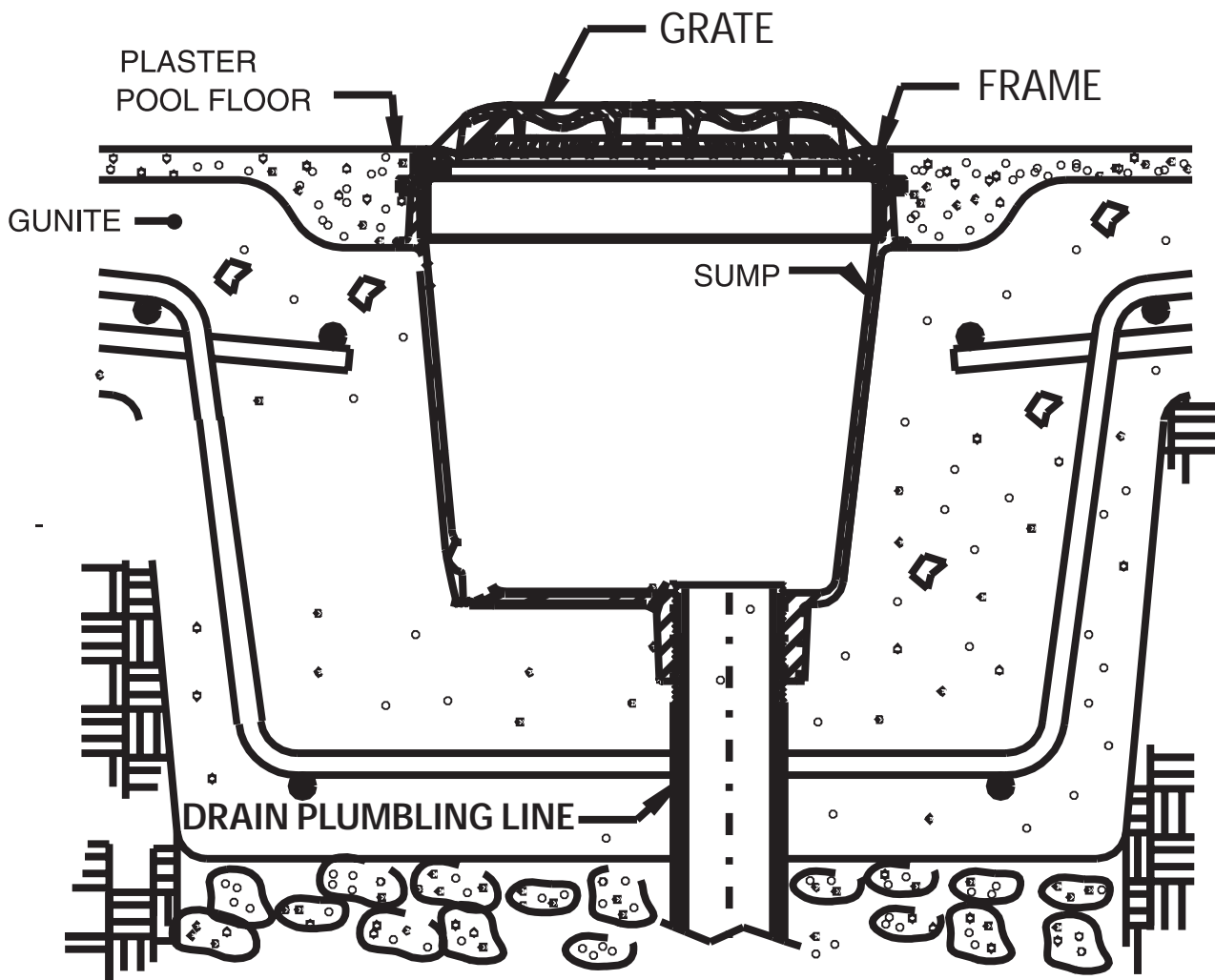
### StarGuard® Square Drain with PVC Sump Installation

The following describes the installation requirements and procedure for a StarGuard® Square Drain with PVC sump.

#### Model Description

- 500410** 9" x 9" StarGuard® Square Drain with 2.5" Spigot and 2" Slip Bottom Port PVC Sump with Grate – White
- 500411** 9" x 9" StarGuard® Square Drain with 2.5" Spigot and 2" Slip Bottom Port PVC Sump with Grate – Black
- 500430** 9" x 9" StarGuard® Square Drain with 4" Slip Bottom Port PVC Sump with Grate – White
- 500431** 9" x 9" StarGuard® Square Drain with 4" Slip Bottom Port PVC Sump with Grate – Black
- 500510** 12" x 12" StarGuard® Square Drain with 4" Slip Bottom Port PVC Sump with Grate – White
- 500511** 12" x 12" StarGuard® Square Drain with 4" Slip Bottom Port PVC Sump with Grate – Black
- 500530** 12" x 12" StarGuard® Square Drain with 6" Slip Bottom Port PVC Sump with Grate – White
- 500531** 12" x 12" StarGuard® Square Drain with 6" Slip Bottom Port PVC Sump with Grate – Black

### Sump Installation



Sump Installation Diagram

## StarGuard® Square Drain with PCV Sump New Installation

To install the Main Drain and PVC sump:

- ⚠ WARNING** ONLY USE THE 316 STAINLESS STEEL 10-32 MACHINE SCREWS PROVIDED. SUBSTITUTE SCREWS SUCH AS MASONRY SCREWS, SHEET ROCK SCREWS OR OTHER TYPES OF SCREWS SHOULD NEVER BE USED, WILL CAUSE THE GRATE TO COME LOOSE AND COULD RESULT IN LIMB OR BODY ENTRAPMENT, HAIR ENTANGLEMENT OR EVISCERATION/DISEMBOWELMENT.

**⚠ WARNING** BEFORE INSTALLING THIS PRODUCT, INSTALLERS, POOL OPERATORS AND POOL OWNERS MUST READ AND UNDERSTAND ALL WARNINGS AND SAFETY PRECAUTIONS SET FORTH ON PAGES ii-vii AND PAGES 1-2 OF THIS INSTALLATION GUIDE.

**⚠ WARNING** IF THE FRAME, SCREW, SUMP OR SCREW HOLES ARE DAMAGED IN ANY WAY THAT PREVENTS COMPLETE INSERTION OF THE SPECIFIED SCREW, THE FRAME, SUMP OR DAMAGED SCREW MUST BE REPLACED. DO NOT ATTEMPT TO MODIFY OR ALTER ANY COMPONENT IN ANY WAY.
- Install the sump in accordance with: **Section 3, Sump Installation Diagram, page 12.**
- Seat the drain grate inside the frame on top of the suction outlet (see Figure 1).
- Install the four (4) 316 stainless steel 10-32 machine screws (provided) into the holes in the top of the grate. Using a No. 2 Philips head screwdriver, tighten each retaining screw to a **torque value of 10.00 (minimum) to 15.0 (maximum) in-lbs** to secure the grate. DO NOT OVER TIGHTEN THE SCREWS. DO NOT ASSEMBLE WITH POWER TOOLS.

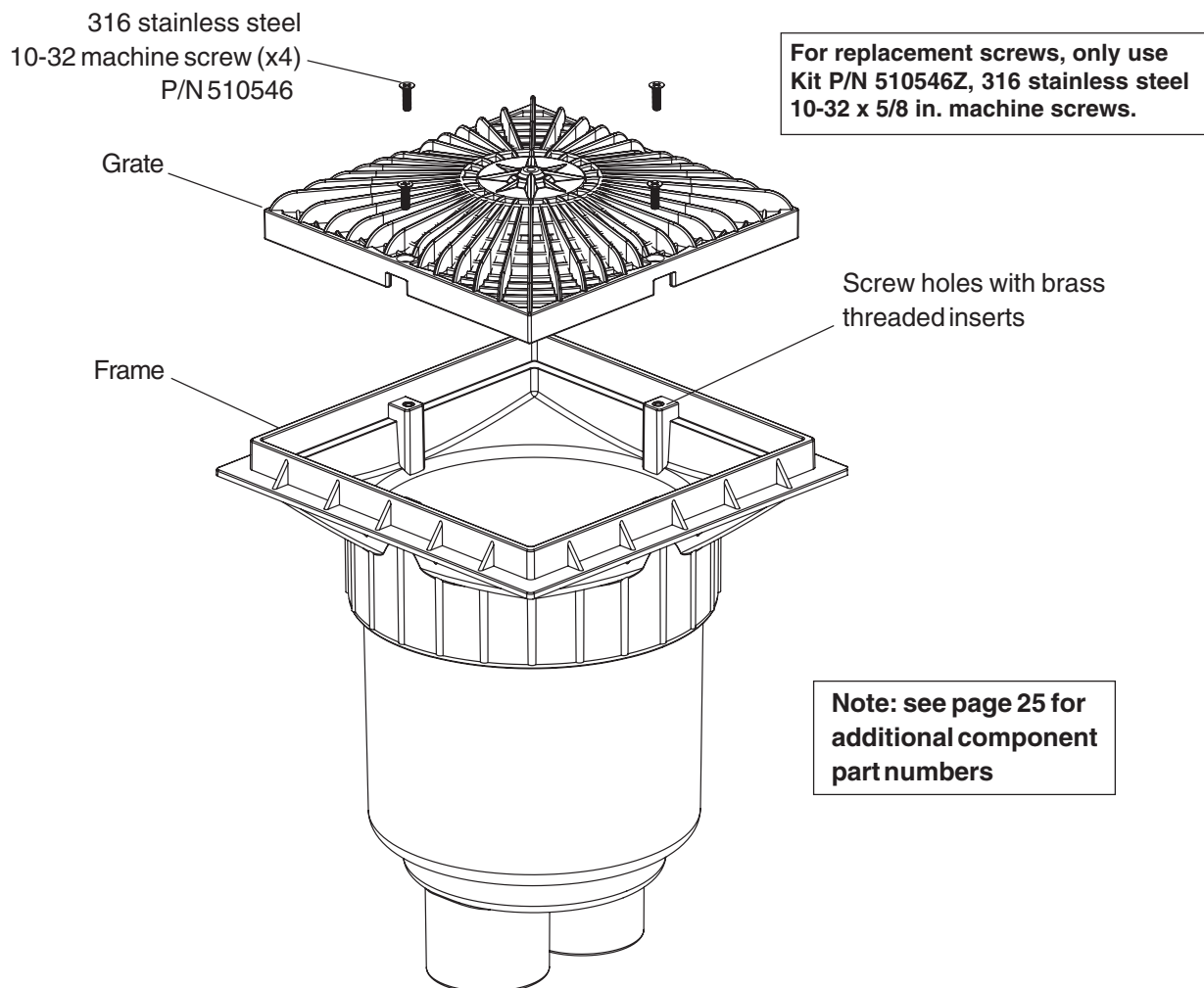
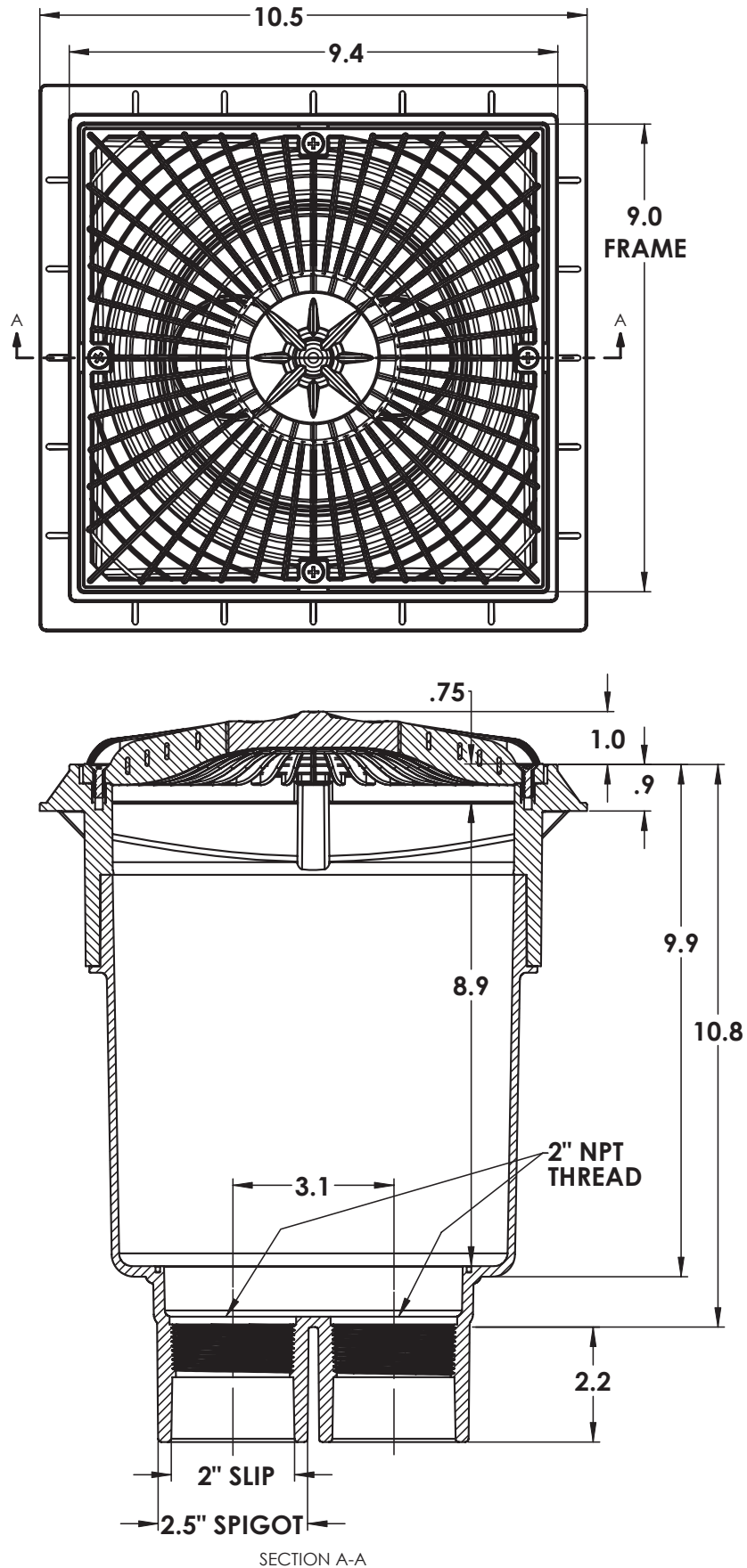
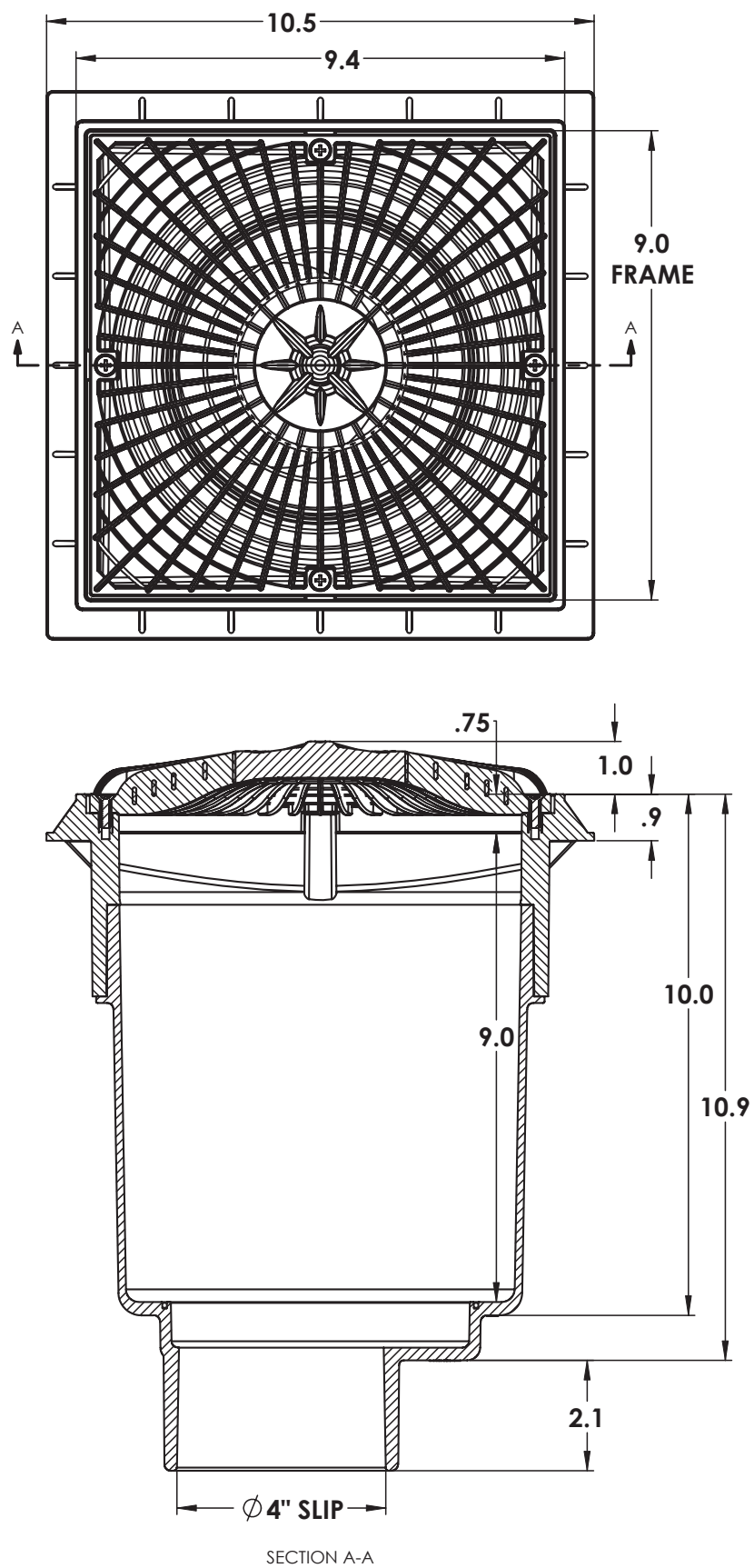
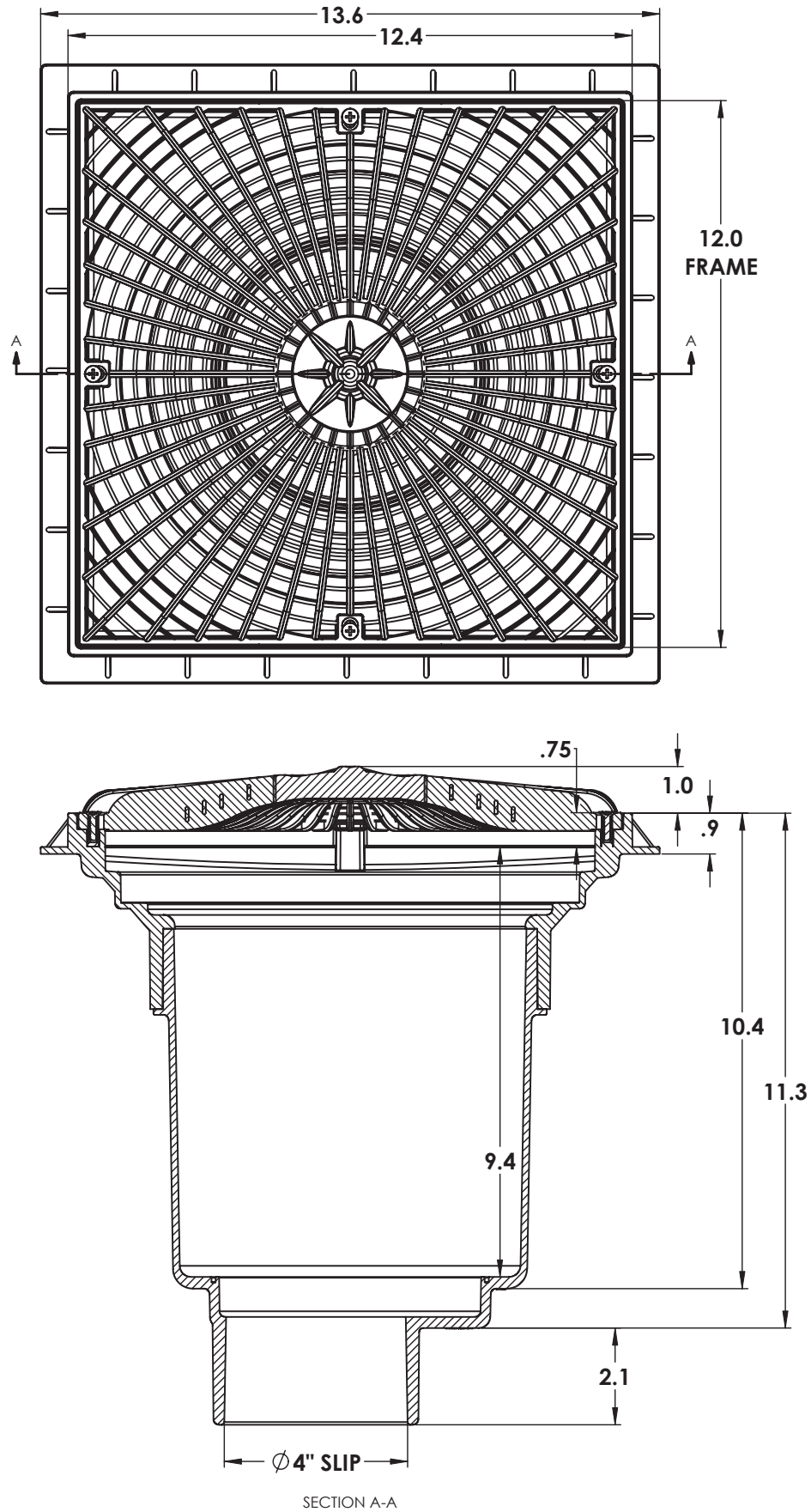


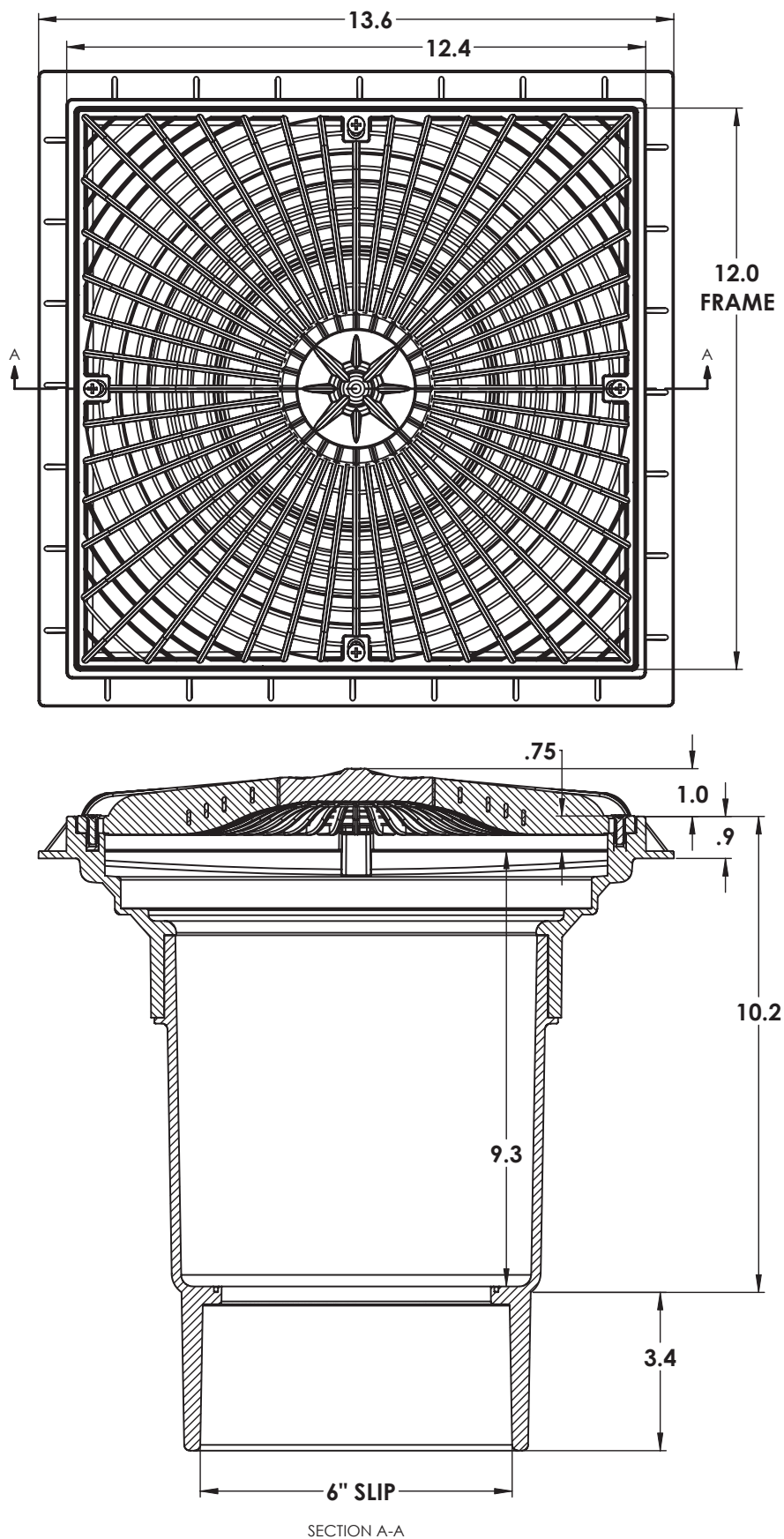
Figure 1

**Dimensions (9"x9") StarGuard® Square Drain with PVC Sump (500410 - 500419)**

**Dimensions (9"x9") StarGuard® Square Drain with PVC Sump (500430 - 500439)**



**Dimensions (12"x12") StarGuard® Square Drain with PVC Sump (500510 - 500519)**

**Dimensions (12"x12") StarGuard® Square Drain with PVC Sump (500530 - 500539)**

## Section 4

### StarGuard® Square Drain with Fiberglass Sump Installation

The following describes the installation requirements and procedure for a StarGuard® Square Drain with Fiberglass sump.

#### Model Description

**500420** 9" x 9" StarGuard® Square Drain with 3" SLIP x FPT Side Port and 2" FPT x FPT Bottom Port  
Fiberglass Sump with Frame and Grate – White

**500421** 9" x 9" StarGuard® Square Drain with 3" SLIP x FPT Side Port and 2" FPT x FPT Bottom Port  
Fiberglass Sump with Frame and Grate – Black

**500520** 12" x 12" StarGuard® Square Drain with 4" SLIP x FPT Side Port and 2" FPT x FPT Bottom Port  
Fiberglass Sump with Frame and Grate – White

**500521** 12" x 12" StarGuard® Square Drain with 4" SLIP x FPT Side Port and 2" FPT x FPT Bottom Port  
Fiberglass Sump with Frame and Grate – Black

**500540** 12" x 12" StarGuard® Square Drain with 6" SLIP x FPT Side Port and 2" FPT x FPT Bottom Port  
Fiberglass Sump with Frame and Grate – White

**500541** 12" x 12" StarGuard® Square Drain with 6" SLIP x FPT Side Port and 2" FPT x FPT Bottom Port  
Fiberglass Sump with Frame and Grate – Black

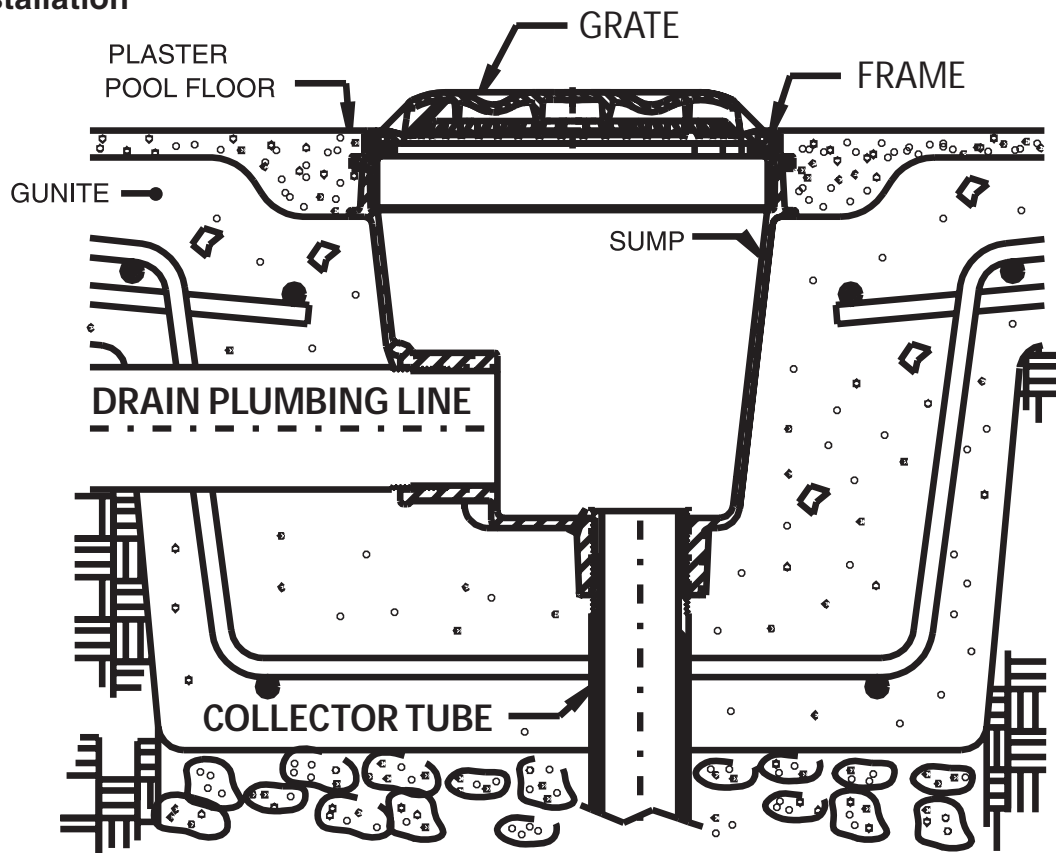
**500610** 18" x 18" StarGuard® Square Drain with 8" SLIP x FPT Side Port and 2" FPT x FPT Bottom Port  
Fiberglass Sump with Frame and Grate – White

**500611** 18" x 18" StarGuard® Square Drain with 8" SLIP x FPT Side Port and 2" FPT x FPT Bottom Port  
Fiberglass Sump with Frame and Grate – Black

**500710** 24" x 24" StarGuard® Square Drain with 10" SLIP x SLIP Side Port and 2" FPT x FPT Bottom Port  
Fiberglass Sump with Frame and Grate – White

**500711** 24" x 24" StarGuard® Square Drain with 10" SLIP x SLIP Side Port and 2" FPT x FPT Bottom Port  
Fiberglass Sump with Frame and Grate – Black

#### Sump Installation



Sump Installation Diagram

## Drain with Fiberglass Sump Installation

The following describes how to install a drain with fiberglass sump.

To install the drain with fiberglass sump:

- ⚠ WARNING** ONLY USE THE 316 STAINLESS STEEL 10-32 MACHINE SCREWS PROVIDED. SUBSTITUTE SCREWS SUCH AS MASONRY SCREWS, SHEET ROCK SCREWS OR OTHER TYPES OF SCREWS SHOULD NEVER BE USED, WILL CAUSE THE GRATE TO COME LOOSE AND COULD RESULT IN LIMB OR BODY ENTRAPMENT, HAIR ENTANGLEMENT OR EVISCERATION/DISEMBOWELMENT.

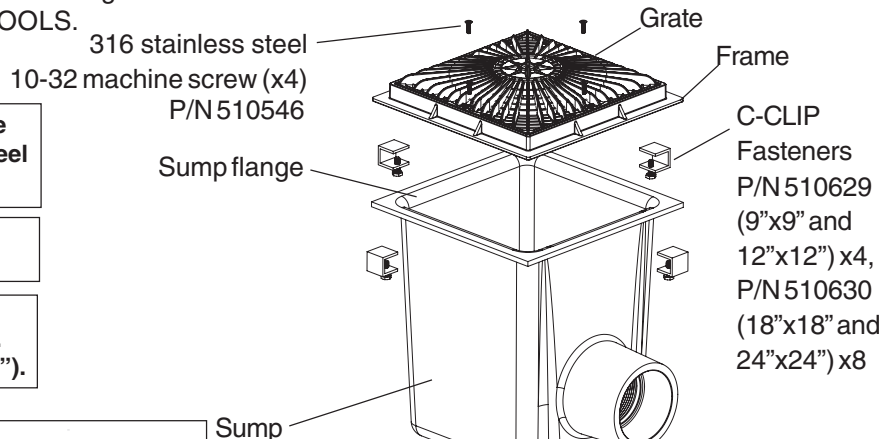
**⚠ WARNING** BEFORE INSTALLING THIS PRODUCT, INSTALLERS, POOL OPERATORS AND POOL OWNERS MUST READ AND UNDERSTAND ALL WARNINGS AND SAFETY PRECAUTIONS SET FORTH ON PAGES ii-vii AND PAGES 1-2 OF THIS INSTALLATION GUIDE.

**⚠ WARNING** IF THE FRAME, SUMP, SCREW OR SCREW HOLES ARE DAMAGED IN ANY WAY THAT PREVENTS COMPLETE INSERTION OF THE SPECIFIED SCREW, THE FRAME, SUMP OR DAMAGED SCREW MUST BE REPLACED. DO NOT ATTEMPT TO MODIFY OR ALTER ANY COMPONENT IN ANY WAY.
  - If you are installing a 24"x24" metal frame, the frame must be connected to the pool bond circuit. Refer to **Section 2, Ground Bonding for New 24"x24" Frame and Grate Installation** on page 7.
  - Install the sump in accordance with: **Section 4, Sump Installation Diagram, page 18.**
  - Clean the sump flange and apply a generous bead of sealant (provided in kit) to the top of the flange (see figure 1).
  - Align and center the frame on the sump flange. Secure the frame with the C-CLIP fasteners, with the bolt side down (see Figure 1).
- 9" x 9" and 12" x 12" sumps use one (1) fastener per side (four (4) provided).  
18" x 18" and 24" x 24" sumps use two (2) fasteners per side (eight (8) provided).
- Seat the drain grate inside the frame on top of the suction outlet (see Figure 2).
  - Install the four (4) 316 stainless steel 10-32 machine screws (provided) for the 9"x9" and 12"x12" grate (16 screws for the 18"x18" and 24"x24" grate) into the holes in the top of the grate.** Using a No. 2 Philips head screwdriver, tighten each retaining screw to a **torque value of 10.00 (minimum) to 15.0 (maximum) in-lbs** to secure the grate. **DO NOT OVER TIGHTEN THE SCREWS. DO NOT ASSEMBLE WITH POWER TOOLS.**

For replacement screws, only use Kit P/N 510546Z, 316 stainless steel 10-32 x 5/8 in. machine screws.

For replacement sealant use Kit P/N 510635Z.

For replacement C-CLIP Kit use P/N 510629Z. (9"x9" and 12"x12"). P/N 510630Z (18"x18" and 24"x24").



The bottom port is only to be used for a hydrostatic relief valve, collector tube, or sealing plug. The side port threads are to be used with the threaded plugs supplied for winterizing or pressure testing. Bottom port should never be used to connect directly to the circulation piping.

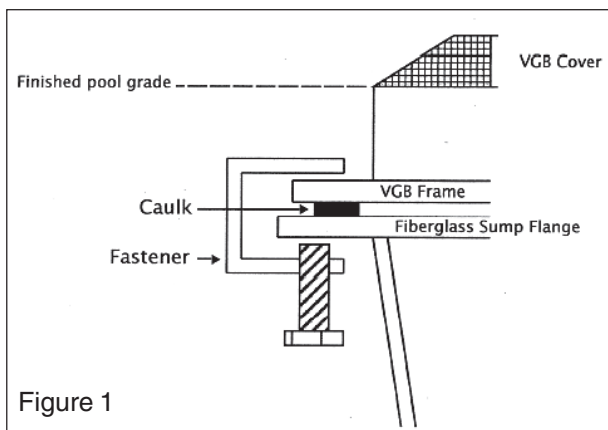
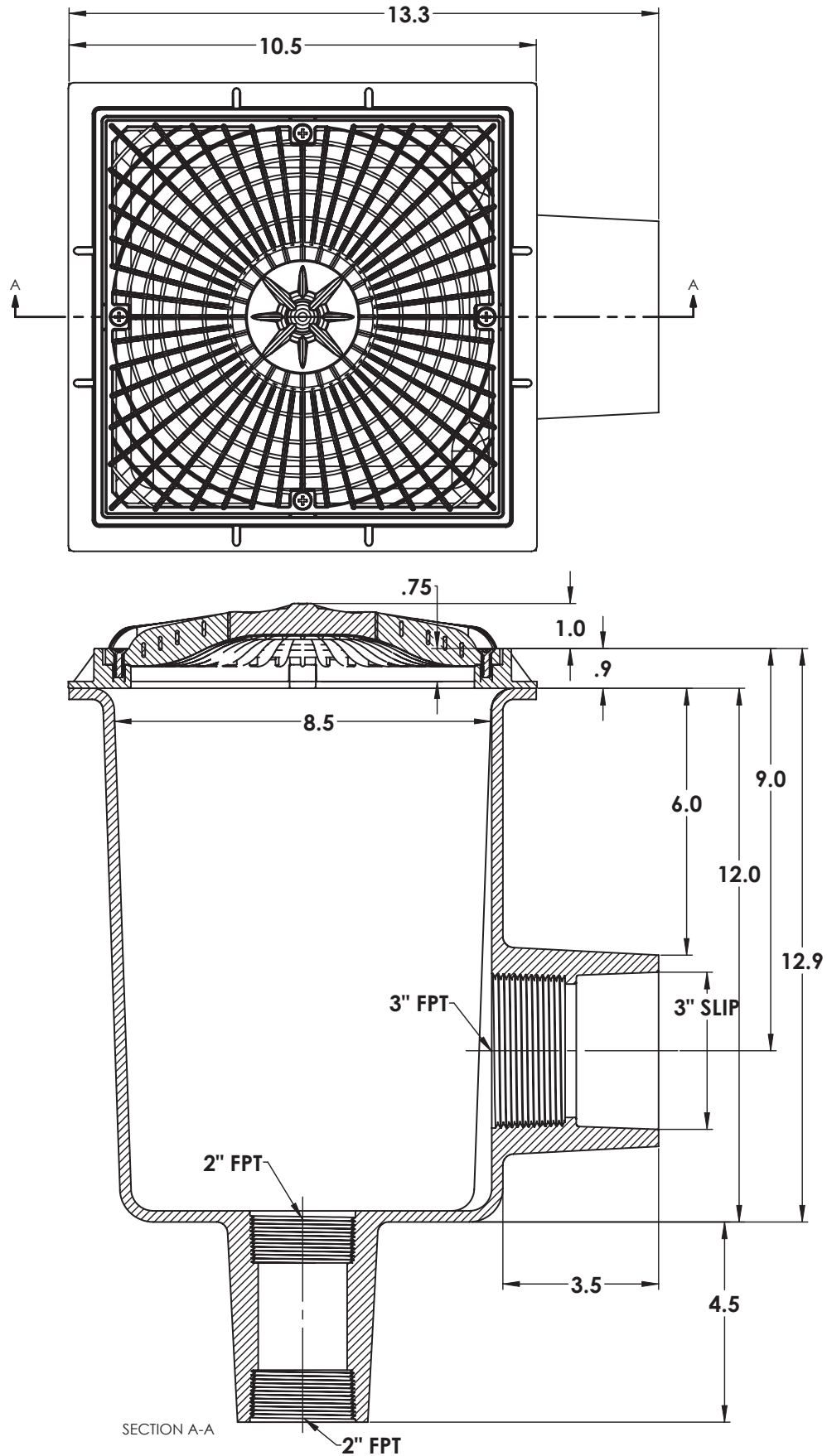


Figure 1

(Note: see page 25 for additional component part numbers)

Figure 2

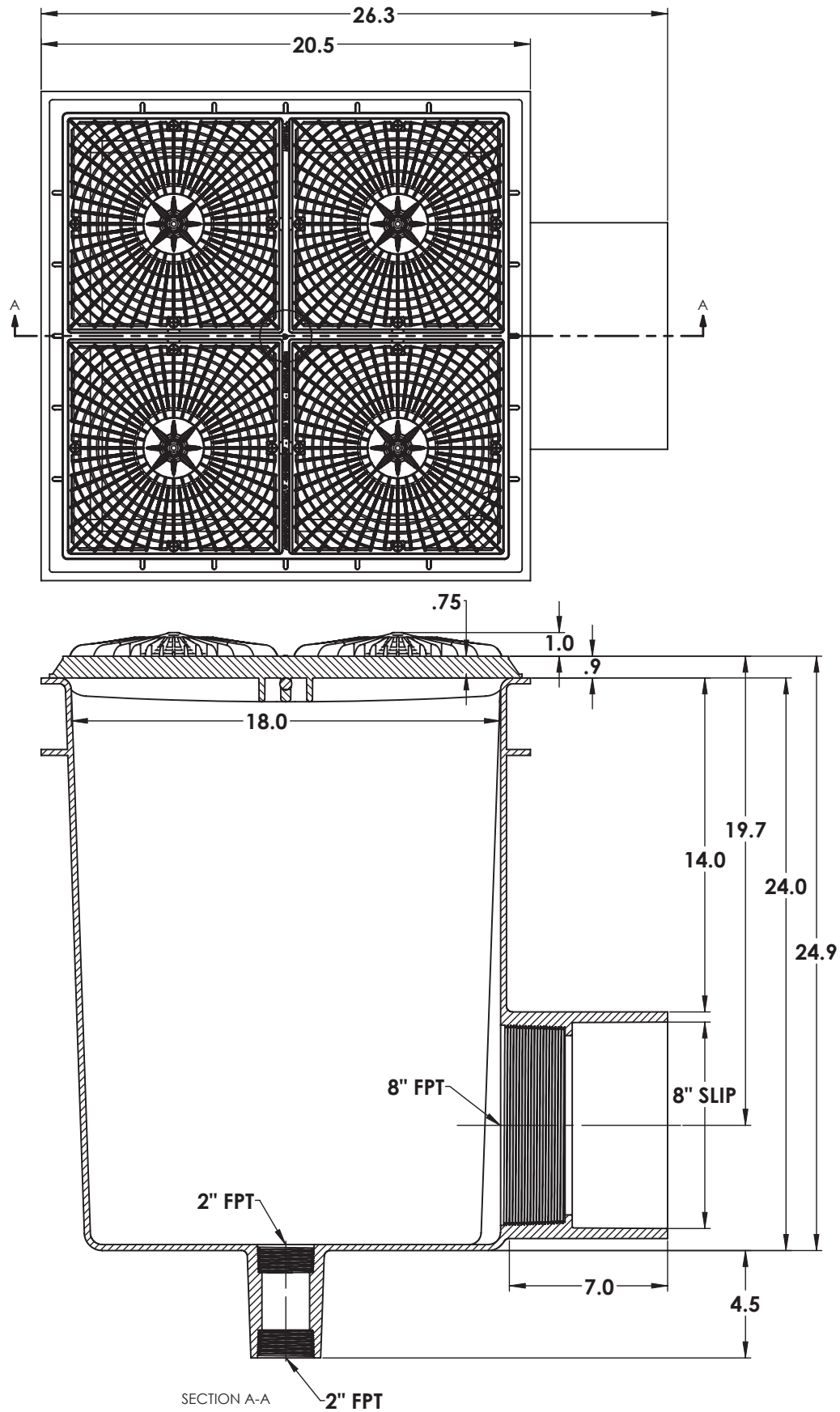
**Dimensions (9"x9") StarGuard® Square Drain with Fiberglass Sump (500420 -500429)**





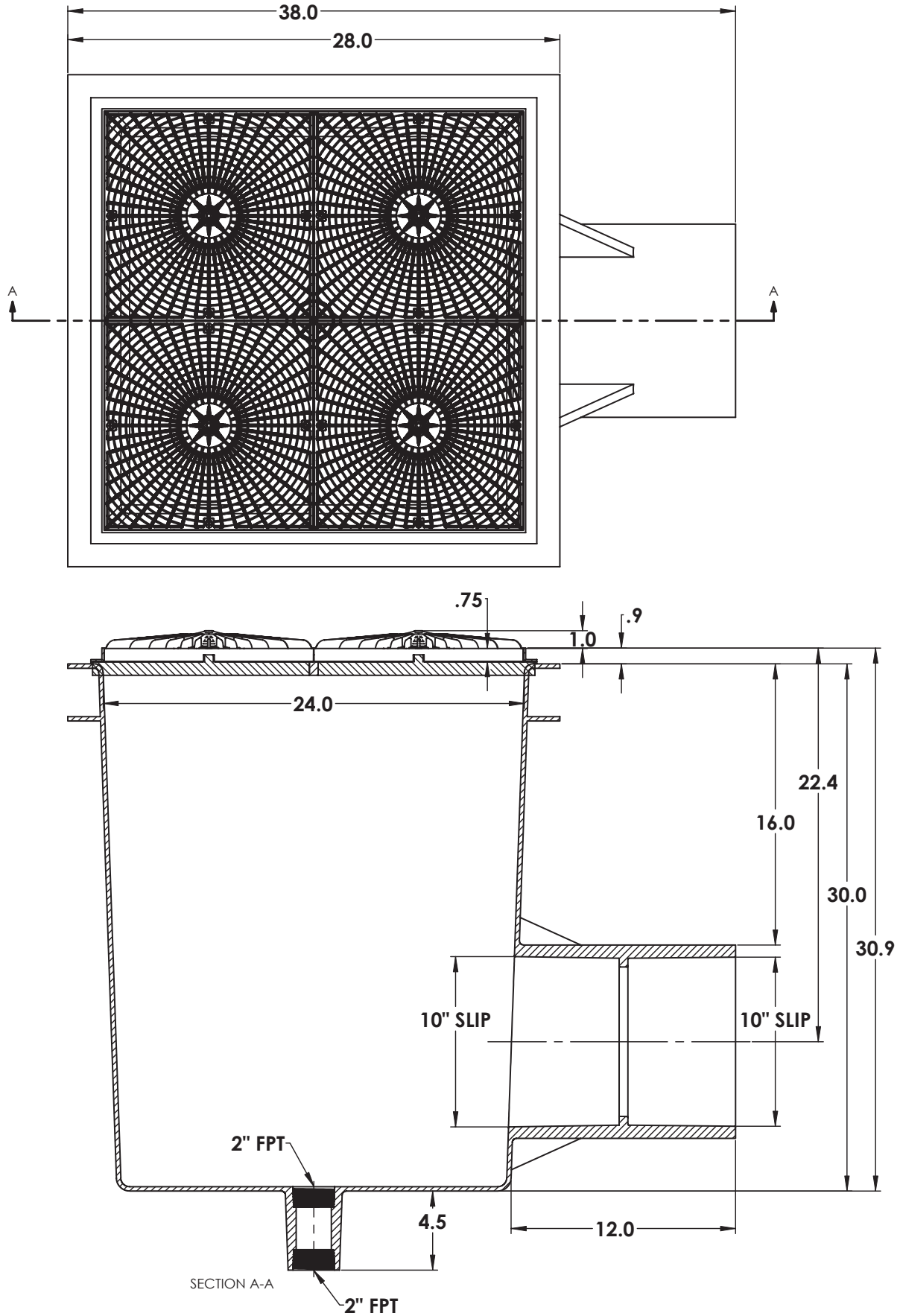


# **Dimensions (18"x18") StarGuard® Square Drain with Fiberglass Sump (500610 - 500619)**





# **Dimensions (24" x 24") StarGuard® Square Drain with Fiberglass Sump (500710 - 500719)**

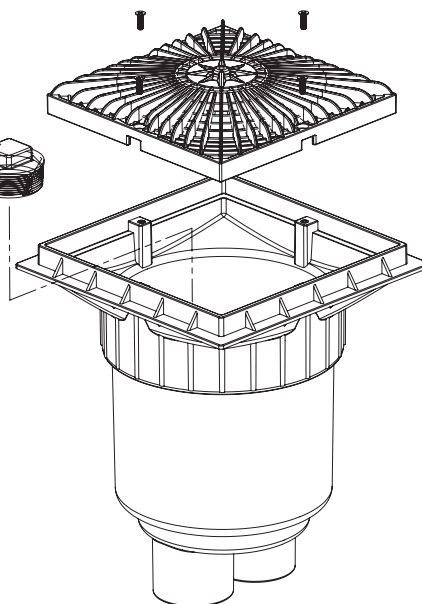
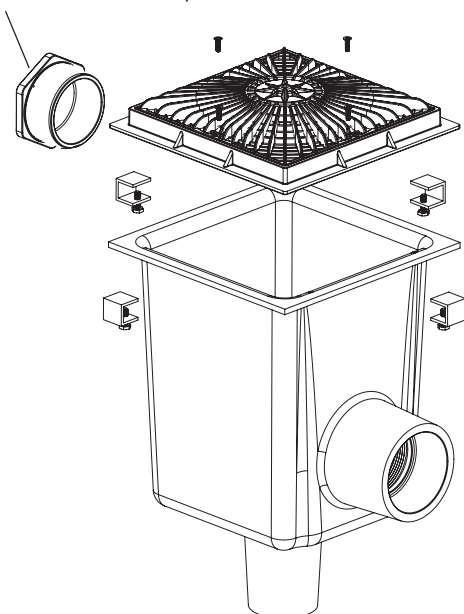


## Hydrostatic Collector Tube and NPT Pressure Test Plugs

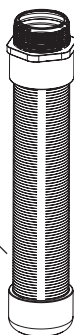
**Note:** All fiberglass drain assemblies include 2" NPT plug, 2" hydrostatic collector tube, and side port pressure testing plug up to 8".

Pressure test plug  
(see parts list table below)

Plug shown is used for  
pressure testing  
of 2" bottom port PVC  
sump.  
Kit P/N 510590Z



Hydrostatic Collector Tube  
(see parts list table below)



Parts List for Fiberglass Sump Assembly		
Part Number	Description	Assembly
510631Z	PLUG,THD, 3",SCH 40	9"x9"
510632Z	PLUG,THD, 4",SCH 40	12"x12" (with 4" side port)
510633Z	PLUG,THD, 6",SCH 40	12"x12" (with 6" side port)
510634Z	PLUG,THD, 8",SCH 40	18"x18"
510642Z	2" NPT PLUG	ALL
510636Z	HYDROSTATIC RELIEF COLLECTOR TUBE	ALL

## CERTIFICATION OF COMPLIANCE

Pentair Water Pool and Spa Inc., 1620 Hawkins Ave., Sanford, NC 27330, (800) 831-7133, hereby certifies that the following model numbers meet or exceed the requirements of Section 1404 of the Virginia Graeme Baker Act Pool & Spa Safety Act, VGB 2008 and ASME/ANSI A112.19.8a (addendum 8a-2008) standards and safety regulations as set forth by the Consumer Products Safety Commission:

CHART 3			
Part No.	Open Area	Flow Rating Floor	Flow Rating Wall
5004XX	38.70 in <sup>2</sup>	270 GPM	270 GPM
5005XX	76.00 in <sup>2</sup>	360 GPM	360 GPM
5006XX	154.80 in <sup>2</sup>	740 GPM	740 GPM
5007XX	304.00 in <sup>2</sup>	1428 GPM	1428 GPM

### IAPMO Certified

These products were tested and certified to the aforementioned safety regulations, by IAPMO Research and Testing. 5001 E. Philadelphia St. Ontario, CA 91761 – USA 877-4UPCMARK (toll free)

Product certification commenced April 2009, test results can be obtained from: [www.pentairwater.com](http://www.pentairwater.com) and/or <http://pld.iapmo.org/>

Each product contains a circular date stamp on the top or bottom of the product showing the month and year of manufacture. These products are manufactured at AquaStar® Pool Products, San Diego, California in the United States of America.

A copy of this certificate is available on the Pentair Water Pool and Spa Inc. website: [www.pentairwater.com](http://www.pentairwater.com)

### Note to installer/owner:

Enter the information below: Please keep this page as a record of the installation date.

Date of Installation: \_\_\_\_\_

## Technical Support

**Sanford, North Carolina** (8 A.M. to 5 P.M. ET.)

**Moorpark, California** (8 A.M. to 5 P.M. PS.)

**Phone:** (800) 831-7133

**Fax:** (800) 284-4151

## Web sites

<http://www.pentairpool.com> and [staritepool.com](http://staritepool.com)



READ, THEN KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE
---

© 2010 Pentair Water Pool and Spa, Inc. All rights reserved

This document is subject to change without notice

1620 Hawkins Ave., Sanford, NC 27330 • (919) 566-8000

10951 West Los Angeles Ave., Moorpark, CA 93021 • (800) 831-7133 • (805) 555-5000



P/N 510555 - Rev B