

IAPMO PS 42-20xx



PUBLIC REVIEW DRAFT

Industry Standard for

**Pipe and Tubing Alignment and
Secondary Support Systems with or
without Pipe and Tubing Safety or
Protection**



PUBLIC REVIEW DRAFT

IAPMO Standard

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Preface

This is the ~~sixth~~-seventh edition of IAPMO PS 42, Pipe Alignment and Secondary Support Systems with or without Pipe Safety or Protection. This Standard supersedes IAPMO PS 42-2013^{e1}, Pipe Alignment and Secondary Support Systems. The previous editions of this standard are: 1991, 1996, April 2012, March 2013, May 2013, [and August 2022](#)

This Standard was developed by the IAPMO Standards Review Committee (SRC) in accordance with the policies and procedures regulating IAPMO industry standards development, Policy S-001, Standards Development Process. This Standard was approved as an IAPMO Industry Standard on **Month Day, 20xx**.

Notes:

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- (4) *During its development, this Standard was made available for public review, thus providing an opportunity for additional input from stakeholders from industry, academia, regulatory agencies, and the public at large. Upon closing of public review, all comments received were duly considered and resolved by the IAPMO Standards Review Committee.*
- (5) *This Standard was developed in accordance with the principles of consensus, which is defined as substantial agreement; consensus implies much more than a simple majority, but not necessarily unanimity. It is consistent with this definition that a member of the IAPMO Standards Review Committee might not be in full agreement with all sections of this Standard.*
- (6) *Although the intended primary application of this Standard is stated in its scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
- (7) *IAPMO Standards are subject to periodic review and suggestions for their improvement will be referred to the IAPMO Standards Review Committee. To submit a proposal for change to this Standard, you may send the following information to the International Association of Plumbing and Mechanical Officials, Attention Standards Department, at standards@IAPMOstandards.org or, alternatively, at 4755 East Philadelphia Street, Ontario, California, 91761, and include "Proposal for change" in the subject line:*
 - (a) *standard designation (number);*
 - (b) *relevant section, table, or figure number, as applicable;*
 - (c) *wording of the proposed change, tracking the changes between the original and the proposed wording;*
and
 - (d) *rationale for the change.*
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 - (a) *the edition of the standard for which the interpretation is being requested;*
 - (b) *the definition of the problem, making reference to the specific section and, when appropriate, an illustrative sketch explaining the question;*
 - (c) *an explanation of circumstances surrounding the actual field conditions; and*
 - (d) *the request for interpretation phrased in such a way that a "yes" or "no" answer will address the issue.*

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- (11) Participation by federal or state agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this Standard.
- (12) Proposals for amendments to this Standard will be processed in accordance with the standards-writing procedures of IAPMO industry standards development, Policy S-001, Standards Development Process.

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IAPMO PS 42–20xx

Pipe and Tubing Alignment and Secondary Support Systems with or without Pipe and Tubing Safety or Protection

1 Scope

1.1 General

1.1.2 This Standard covers pipe alignment and secondary support systems and specifies requirements for materials, physical characteristics, performance testing, and markings.

1.1.3 Pipe and tubing alignment and secondary support systems covered by this Standard are intended for:

- residential and commercial applications; and
- above-ground and buried installations.

1.2 Alternative Materials

The requirements of this Standard are not intended to prevent the use of alternative materials or methods of construction provided such alternatives meet the intent and requirements of this Standard.

1.3 Terminology

In this Standard,

- “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy to comply with the Standard;
- “should” is used to express a recommendation, but not a requirement;
- “may” is used to express an option or something permissible within the scope of the Standard; and
- “can” is used to express a possibility or a capability.

Notes accompanying sections of the Standard do not specify requirements or alternative requirements; their purpose is to separate explanatory or informative material from the text. Notes to tables and figures are considered part of the table or figure and can be written as requirements.

1.4 Units of Measurement

SI units are the primary units of record in global commerce. In this Standard, the inch/pound units are shown in parentheses. The values stated in each measurement system are equivalent in application, but each unit system is to be used independently. All references to gallons are to U.S. gallons.

2 Reference Publications

This Standard refers to the following publications, and where such reference is made, it shall be to the current edition of those publications, including all amendments published thereto.

ASTM International

ASTM A653

Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM D2000

Standard Classification System for Rubber Products in Automotive Applications

IAPMO (International Association of Plumbing and Mechanical Officials)

IAPMO IGC 193

Safety Plates, Plate Straps, Notched Plates and Safety Collars

3 Definitions and Abbreviations

Reserved

4 General Requirements

4.1 General

4.1.1 Pipe [and tubing](#) alignment and secondary support systems

- (a) are intended to help locate and align pipes [and tubing](#) in their proper position and to maintain proper slope; and
- (b) can be any combination of straps, panels, brackets, clips, clamps, bushings, plumber's tape, or isolation devices. The exact configuration of a system will depend on the design of the system and the pipes [or tubing](#) to be aligned and supported.

4.1.2 Figures 1 to [4 5](#) show typical pipe alignment and secondary support systems and illustrate the concept of such systems, but are not intended to cover the full range of options.

4.2 Design Considerations

4.2.1 Pipe [and tubing](#) alignment and secondary support system components shall be designed to be installed:

- (a) in accordance with the plumbing code and generally accepted installation practices; and
- (b) without causing damage to the piping [or tubing](#).

4.2.2 Pipe alignment and secondary support systems shall have a means to:

- (a) dampen vibration; and
- (b) provide electrolytic isolation to prevent galvanic corrosion.

4.3 Dimensions

Dimensions and geometry of pipe [and tubing](#) alignment and secondary support systems shall be as specified in the manufacturer's shop drawings.

4.4 Materials

4.4.1 Sink Panels

4.4.1.1 Sheet Metal

Sheet metal for sink panels shall

- (a) be hot-dip galvanized steel with at least a 0.4 mm (0.0157 in) thick Z275 (G90) zinc coating that complies with ASTM A653; and
- (b) have at least the following mechanical properties:
 - (i) steel thickness: 26 ga [0.55 mm (0.0217 in)];
 - (ii) yield strength: 262 MPa (38,000 psi);
 - (iii) ultimate tensile strength: 345 MPa (50,000 psi);
 - (iv) maximum elongation: 36%; and
 - (v) hardness Rockwell B scale (HRB): 50.

4.4.1.2 Rubber Grommets

Sink panels shall be supplied with rubber grommets to provide electrolytic isolation between the pipes and the sink panel sheet metal. The rubber shall be classified as 2AA606 in accordance with ASTM D2000 and shall have at least the following characteristics:

- (a) Minimum temperature rating: -40 °C (-40°F);
- (b) Maximum temperature rating: 107 °C (225°F);
- (c) Hardness: 60 ± 5% Shore A durometer;
- (d) Elongation: 250%; and
- (e) Tensile strength: 6,000 kPa (870 psi).

4.4.2 Plastic Stakes

4.4.2.1 Plastic stakes may be made of blends of recycled or reworked polymers.

Note: *An example of an acceptable material is a blend of approximately 75% recycled polypropylene and 25% polyinosic (fiberglass), by weight.*

4.4.2.2 Elastic straps shall be made of natural rubber that complies with or exceeds the following properties:

- (a) Compression set: 8%;
- (b) Density: 0.95 g/cm³ (59.3 lb/ft³);
- (c) Elongation at break: 650%;
- (d) Hardness: 55 Shore A durometer; and
- (e) Breaking force: 155 N (35 lbf).

4.4.2.3 Metal rings for attaching the rubber straps to the plastic stakes shall be made of C45 (SAE 1045) steel.

4.4.3 Bend Supports

4.4.3.1 Bend supports are intended for use with flexible tubing and may be made of polymers such as glass reinforced nylon or polyphenylene oxide (PPO), or from metals such as stainless steel or zinc plated carbon steel. Bend supports accommodate flexible tubing in sizes 1.27 cm – 2.54 cm (½” – 1”).

4.5 **Pipe and Tubing Safety or Protection**

Systems Incorporating pipe or tubing safety or protection shall comply with IAPMO IGC 193.

5 **Testing Requirements**

5.1 **Load Tests**

5.1.1 **Load Test for Pipe Alignment Systems other than Plastic Stakes**

Pipe alignment systems intended for horizontal runs shall be able to withstand a load of 11.3 kg (25 lb) without permanent deformation.

5.1.2 **Load Test for Plastic Stakes**

Each individual plastic stake shall be able to withstand a load of 84 kg (185 lb) without permanent deformation. For testing purposes, the stakes shall be spaced in accordance with the manufacturer’s installation instructions.

5.1.3 **Load Test for Bend Supports**

Bend supports that are intended to be attached to studs, flooring or other building structure(s) shall be installed per the manufacturer’s instructions. With flexible tubing installed and one end of the tubing affixed to an immovable base, the bend support shall not exhibit any permanent deformation when a load of 11.3 kg (25 lb) is applied to the free end of the tubing.

5.2 **Impact Test for Plastic Stakes**

5.2.1 **Procedure**

The impact test for plastic stakes shall be conducted as follows:

- (a) Hold the specimen in a vertical position at one-third of the distance between the tip of the stake and the bottom of the semicircle where the pipe is intended rest.
- (b) Apply an impact energy of 20 J (15 lbf-ft) on the bottom of the semicircle using a tup (falling mass) having the geometry and dimensions specified in Figure 56. Each specimen shall be struck only once.

5.2.2 **Failure Criteria**

Failure shall be shattering, cracking, or splitting as a result of the impact that is visible using normal or corrected-to-normal vision.

5.3 Impact Test for Bend Supports

5.3.1 Procedure

The impact test for bend supports shall be conducted as follows:

- (a) Secure the specimen such that one end of the tube acceptance orifice is aligned horizontally and the other end vertically.
- (b) Apply an impact energy of 20 J (15 lbf-ft) on the approximate inside center of the bend radius using a tup (falling mass) having the geometry and dimensions specified in Figure 6. Each specimen shall be struck only once.

5.3.2 Failure Criteria

Failure shall be shattering, cracking, or splitting as a result of the impact that is visible using normal or corrected-to-normal vision.

6 **Markings and Accompanying Literature**

6.4 **Markings**

Pipe and tubing alignment and secondary support systems complying with this Standard shall be marked with the

- (a) manufacturer's name or trademark; and
- (b) part or model number, when applicable.

6.5 **Visibility**

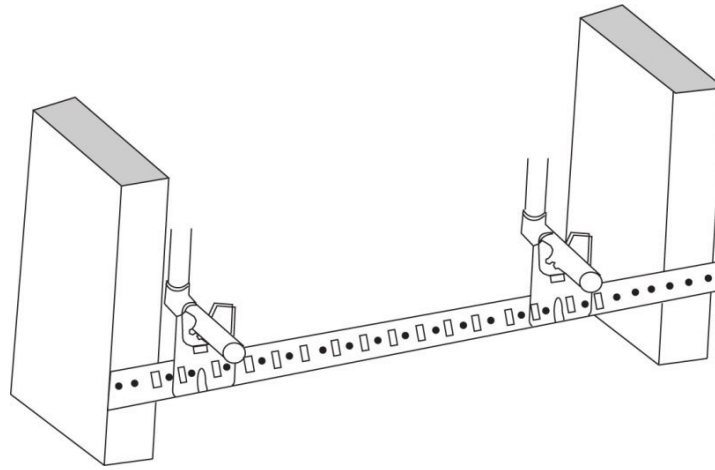
Markings shall be permanent, legible, and visible after installation, when practicable.

6.6 **Installation Instructions**

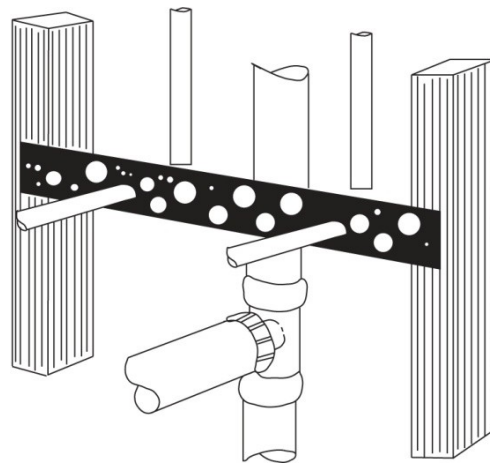
Pipe and tubing alignment and secondary support systems complying with this Standard shall be accompanied by installation instructions indicating, as a minimum, that their installation shall be in accordance with:

- (a) the manufacturer's recommendations; and
- (b) generally accepted plumbing practices.

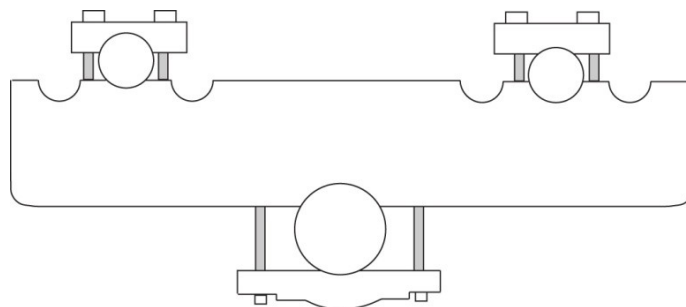
Installation instructions may be provided in the form of printed material, or a quick response (QR) code or internet link legibly printed on the packaging where users can download the required instructions.



(a)



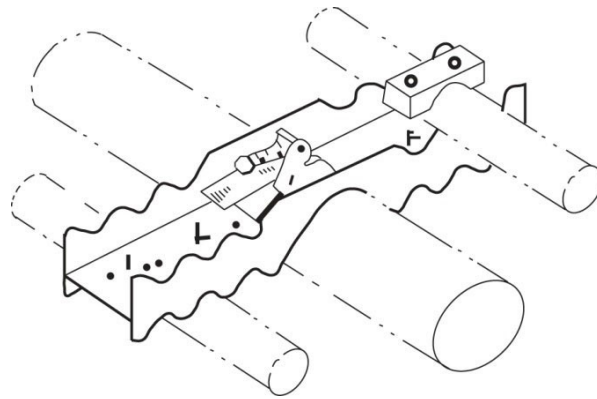
(b)



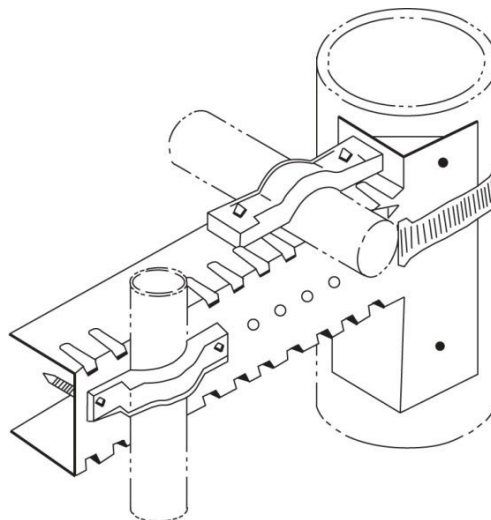
(c)

Figure 1
Typical Pipe Alignment and Secondary Support Systems
(See Section 4.1.2)

(Continued)



(d)



(e)

Figure 1 (concluded)

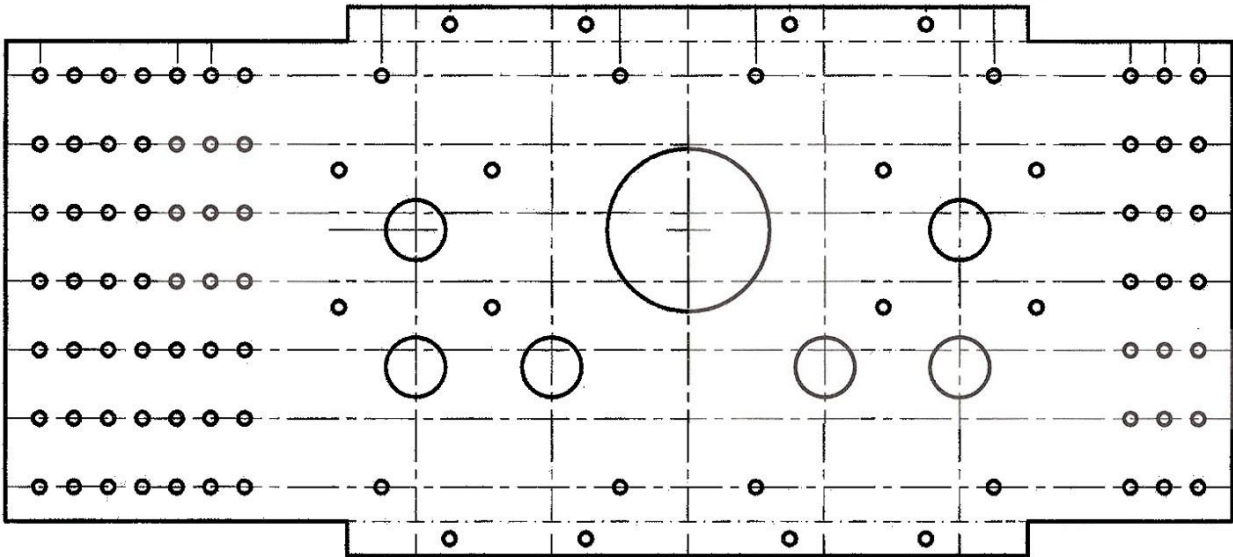
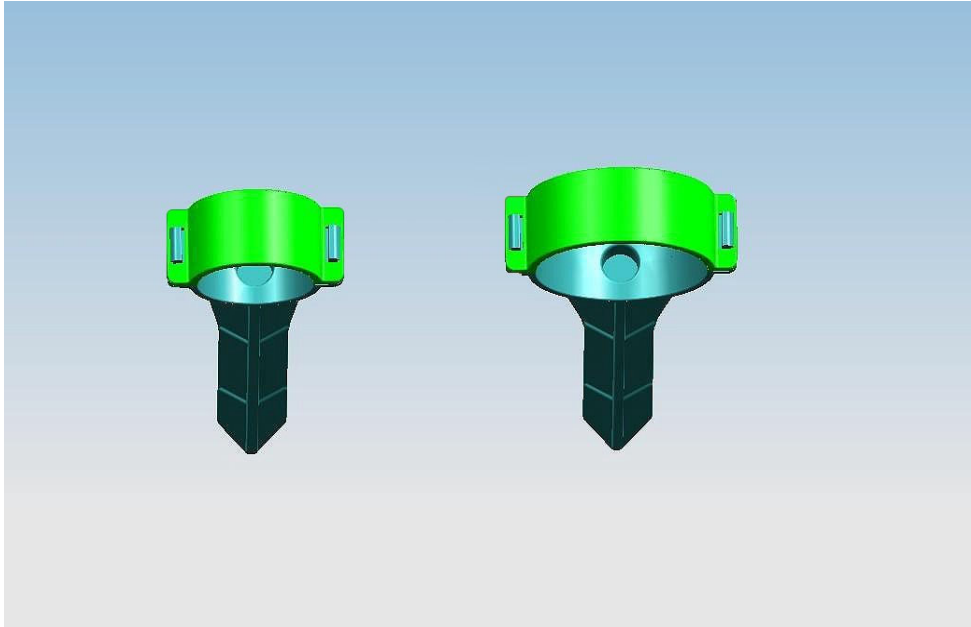
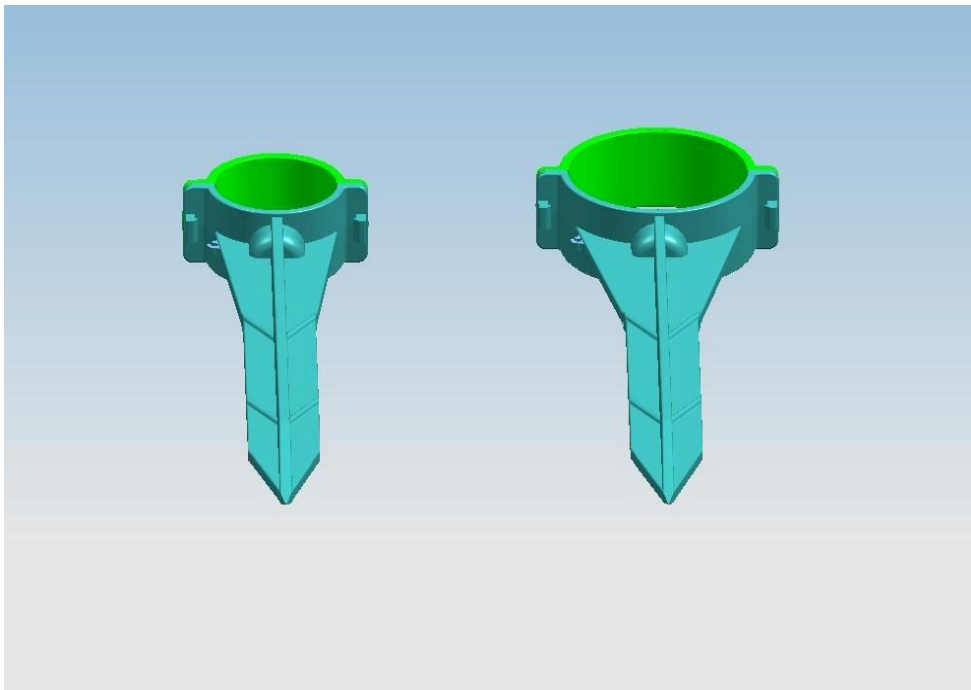


Figure 2
Typical Sink Panel
(See Section 4.1.2)



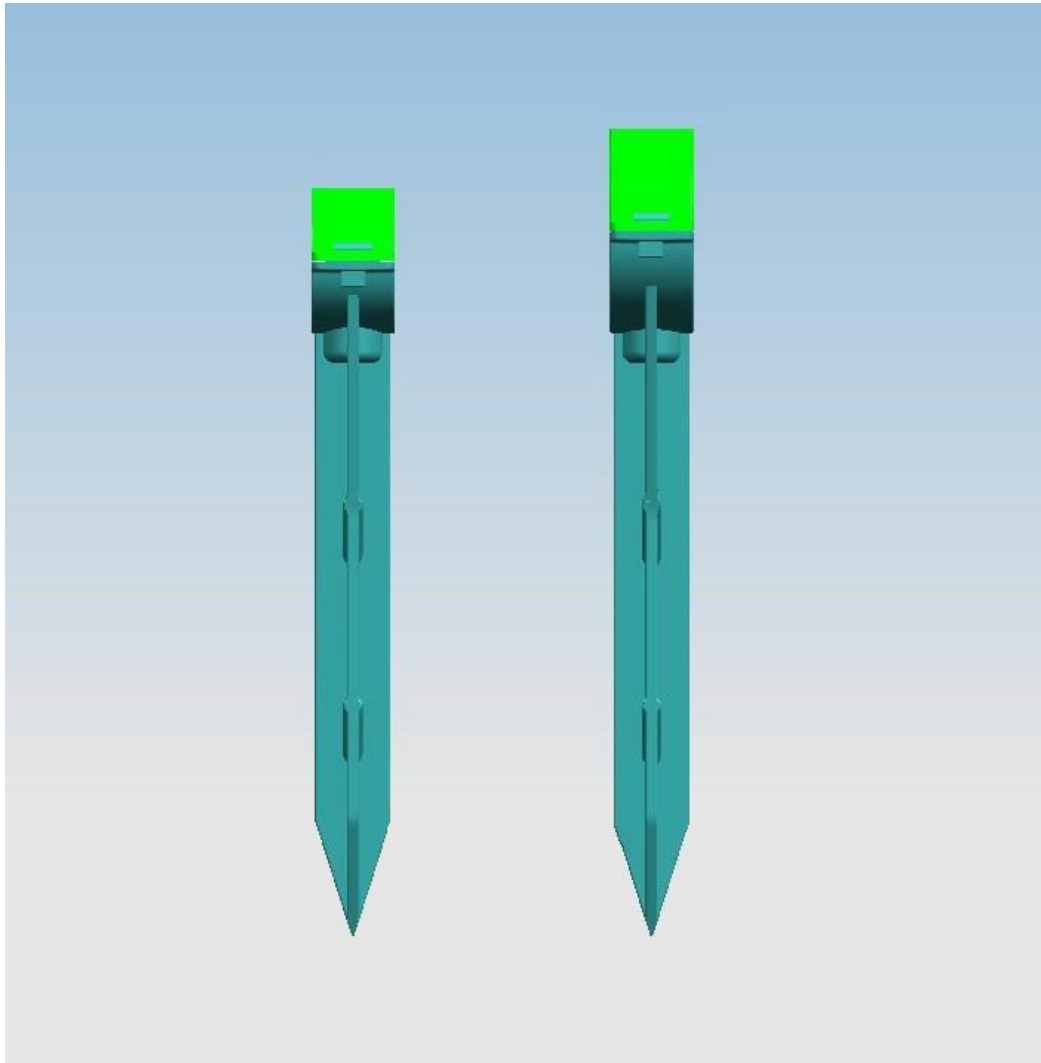
(a) Top View



(b) Bottom View

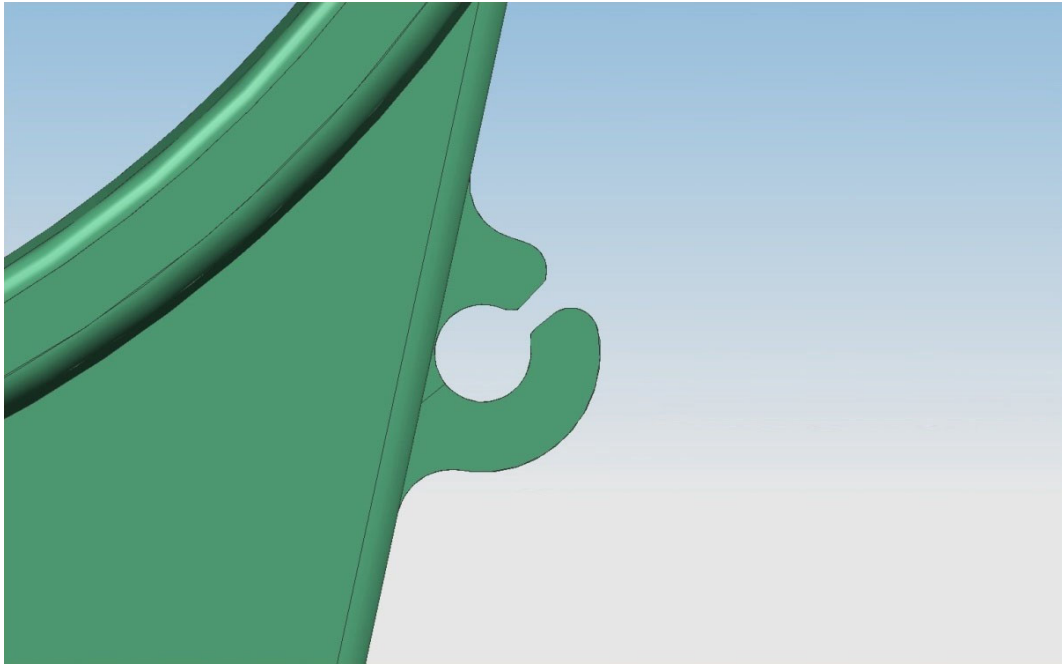
Figure 3
Typical Stakes with Rigid Straps
(See Section 4.1.2)

(Continued)

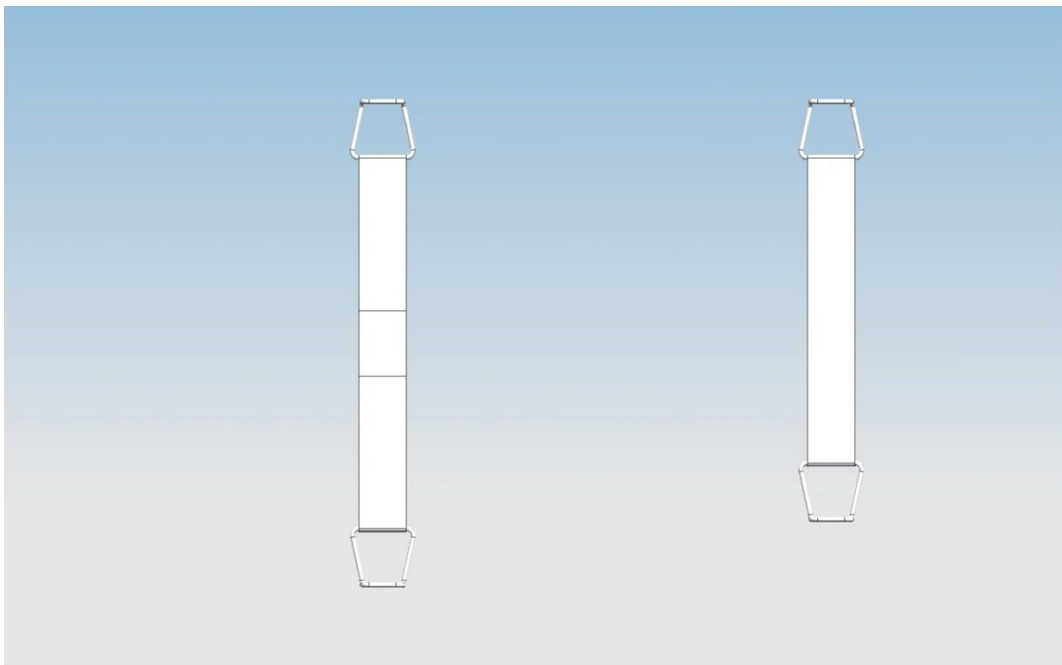


(c) Side View

Figure 3 (concluded)



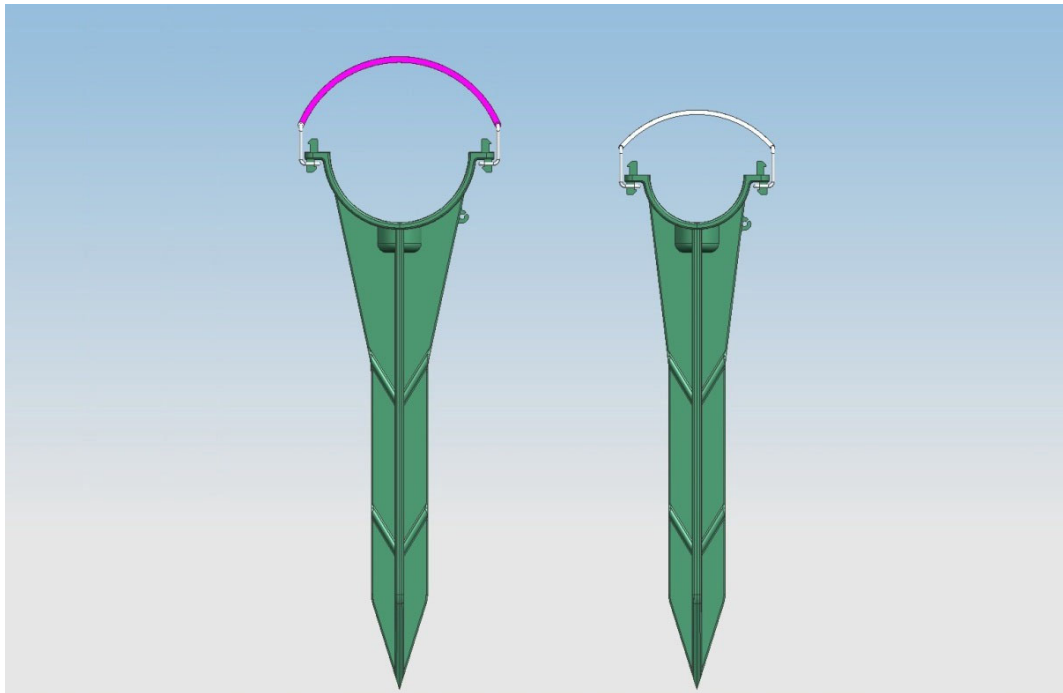
(a) Strap Detail



(b) Rubber Straps

Figure 4
Typical Stakes with Rubber Straps
(See Section 4.1.2)

(Continued)



(c) Front View
Figure 4 (concluded)

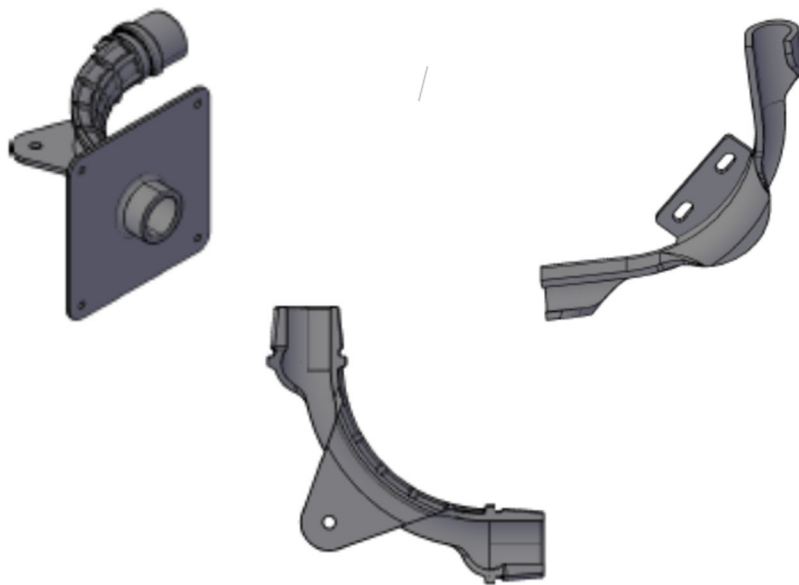


Figure 5
[Typical Bend Supports](#)

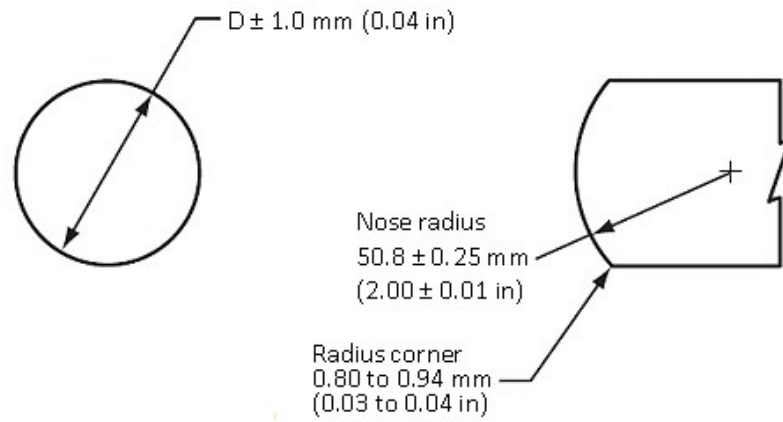


Figure 6
Top Dimensions for the Impact Test
(See Section 5.2.1)



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