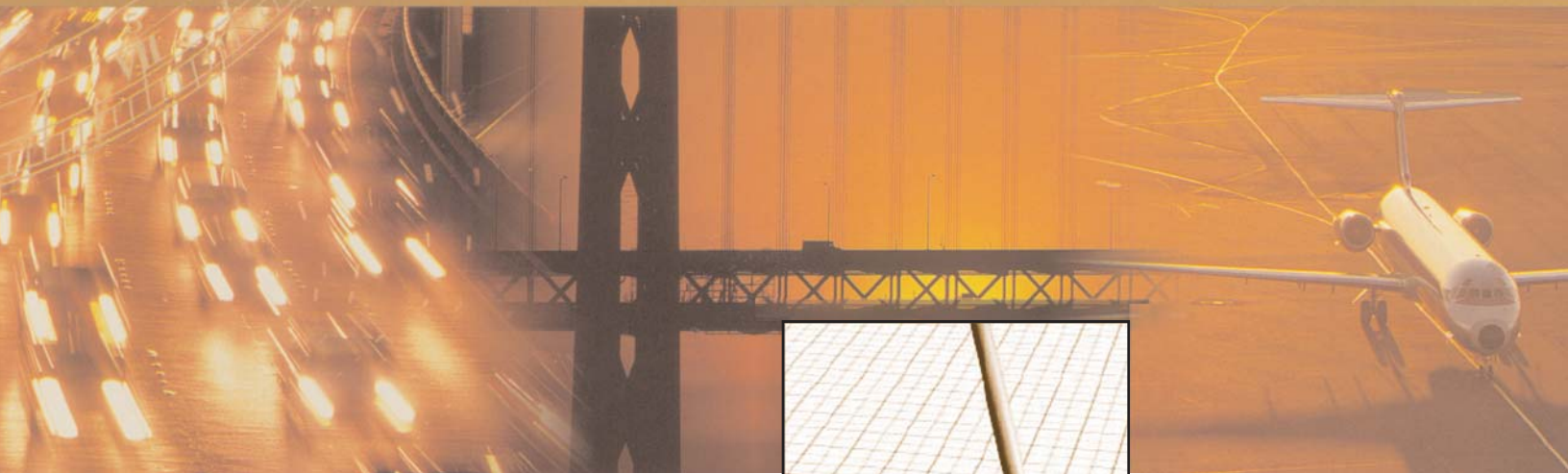


Engineered

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For Transportation



Pole-Safe[®]

Breakaway Lightpole Support Systems

Design Book

 **TRANSPO[®]**
INDUSTRIES, Inc.
The Smart Solutions Company

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Saving Lives

Breakaway Light Pole Support System

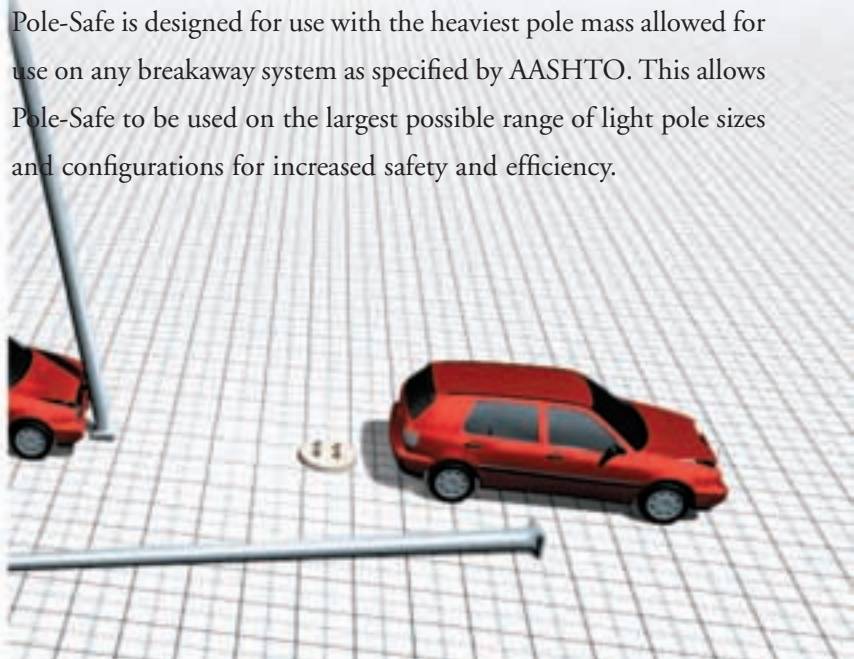


Transpo's "Double-Neck" Pole-Safe[®] is an omni-directional breakaway support system for light poles located within roadside clear zones or other locations vulnerable to vehicular impacts. The primary component of the system is a high strength coupling, designed to breakaway quickly and cleanly upon

impact, thus saving lives and reducing property damage costs. "Double-Neck" Pole-Safe is omni-directional, meaning the system breaks away with consistent, predictable behavior regardless of the vehicle's angle of impact. Pole-Safe has been vehicle crash-tested in accordance with NCHRP report 350, and is approved for use on all FHWA funded projects.

In addition to superior safety performance, Pole-Safe provides high structural load-carrying capacity. Extensive finite element analysis and simulated wind-load testing has been used to optimize the system for maximum loading conditions.

Pole-Safe is designed for use with the heaviest pole mass allowed for use on any breakaway system as specified by AASHTO. This allows Pole-Safe to be used on the largest possible range of light pole sizes and configurations for increased safety and efficiency.



Features and Advantages

Superior Breakaway Performance: The precisely machined geometry of the Pole-Safe coupling design causes the system to fracture safely at relatively low force and energy levels. This unique capacity is better than AASHTO's requirements for impact velocity change. The low stub projection after impact eliminates under carriage damage to vehicle, thus reducing the risk of fire.

High Structural Capacity: Pole-Safe is available in a variety of models, designed to support many different pole configurations subjected to various loading conditions. The high strength coupling design offers exceptional resistance to forces created by wind and dead loads. All Pole-Safe crash tests were conducted using a 55' high, 930 lb. Pole, which is the maximum allowable pole mass as specified by AASHTO. The unique physical properties and breakaway performance of "Double-Neck" Pole-Safe gives designers the greatest flexibility in sizing poles for specific lighting requirements.

High Durability: All Pole-Safe couplings and hardware are hot-dip galvanized in accordance with ASTM A153 to provide proven corrosion protection in harsh roadside environments. Additionally, independent fatigue testing has demonstrated that Pole-Safe couplings are capable of withstanding more than 2 million loading cycles with no reduction in structural capacity.



Easy to Install and Maintain:

No special tools or equipment are required to properly install and maintain Pole-Safe. All components are easily secured using the American Institute of Steel Construction (AISC) Turn-of-

Model Selection:

Pole-Safe Model 4000 Series:

For use with externally threaded anchor bolts.

Pole-Safe Model No.	Anchor Bolt Diameter
4062	5/8 in (16 mm)
4075	3/4 in (19 mm)
4100	1 in (25 mm)
4125	1-1/4 in (32 mm)

Pole-Safe Model 5000 Series:

For use with Transpo foundation anchor inserts.

Pole-Safe Model No.	Anchor Socket Diameter
5062	5/8 in (16 mm)
5075	3/4 in (19 mm)
5100	1 in (25 mm)
5125*	1-1/4 in (32 mm)

* Special order.

Nut Tightening method, which eliminates the need for precise torque levels on bolts.

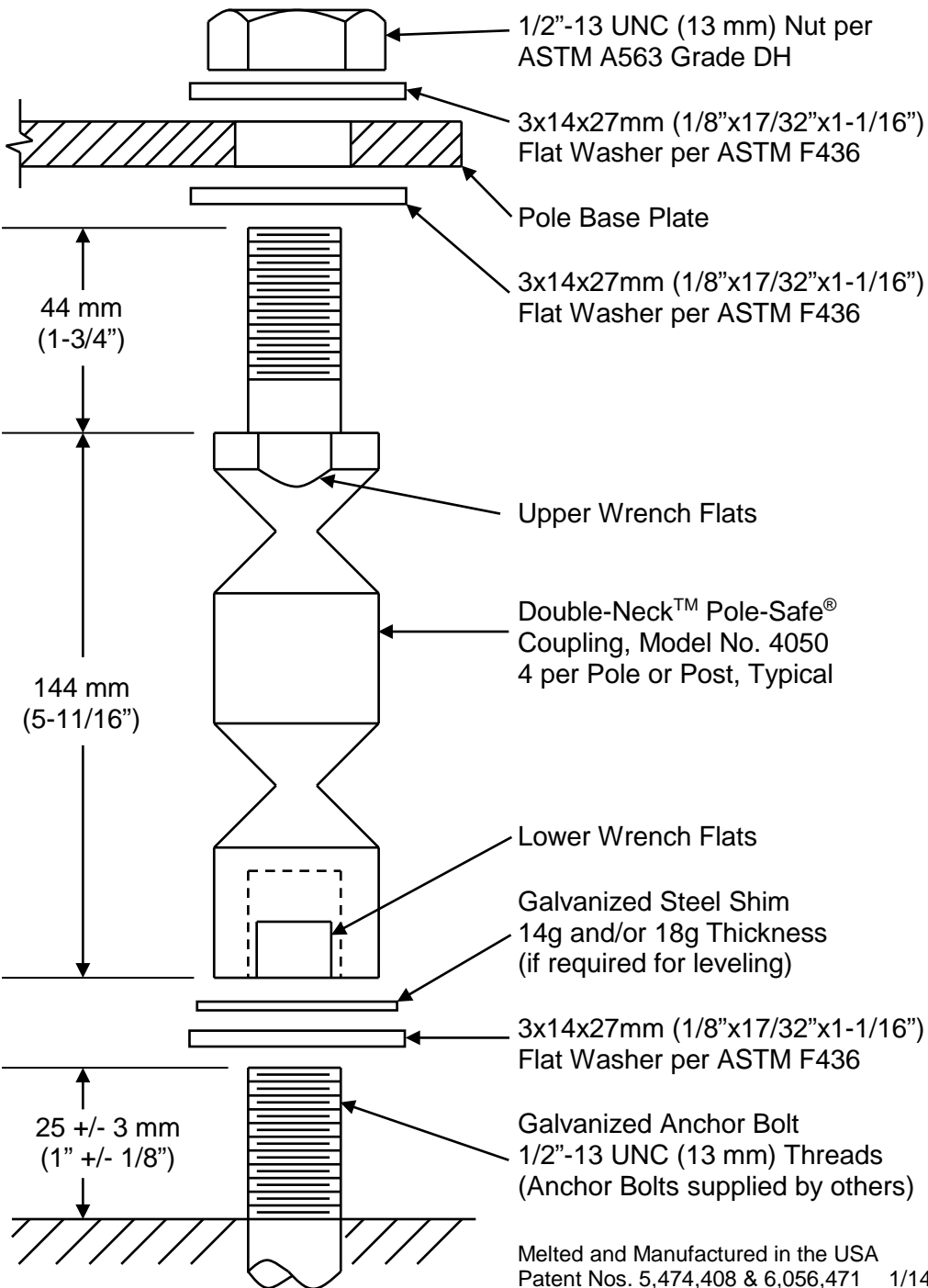
Low Cost: Pole-Safe is the lowest cost breakaway system for light poles. Low initial cost coupled with high structural capacity and zero maintenance makes Pole-Safe the most cost-effective solution for all breakaway light poles.

TESTED AND APPROVED TO NCHRP 350



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Melted and Manufactured in the USA
 Patent Nos. 5,474,408 & 6,056,471 1/14

SPECIFICATIONS

Performance Criteria:

1. Double-Neck™ Pole-Safe® conforms to AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals."
2. Double-Neck™ Pole-Safe® has been crash-tested and FHWA approved in accordance with the requirements of NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Physical Properties per Coupling:

1. Ultimate Tensile Strength = 53.8 kN (12.1 kips), minimum.
2. Tensile Yield Strength = 46.5 kN (10.4 kips), minimum.
3. Ultimate Restrained Shear Strength = 2.6 kN (0.6 kips), minimum.
4. Ultimate Restrained Shear Strength = 4.4 kN (1.0 kips), maximum.

Corrosion Protection:

1. All Double-Neck™ Pole-Safe® couplings, nuts, bolts, and washers are galvanized after fabrication in accordance with ASTM A153. All leveling shims are galvanized after fabrication in accordance with ASTM A653.

Pole-Safe® Model No. 4050
 Breakaway Support System for Light Poles



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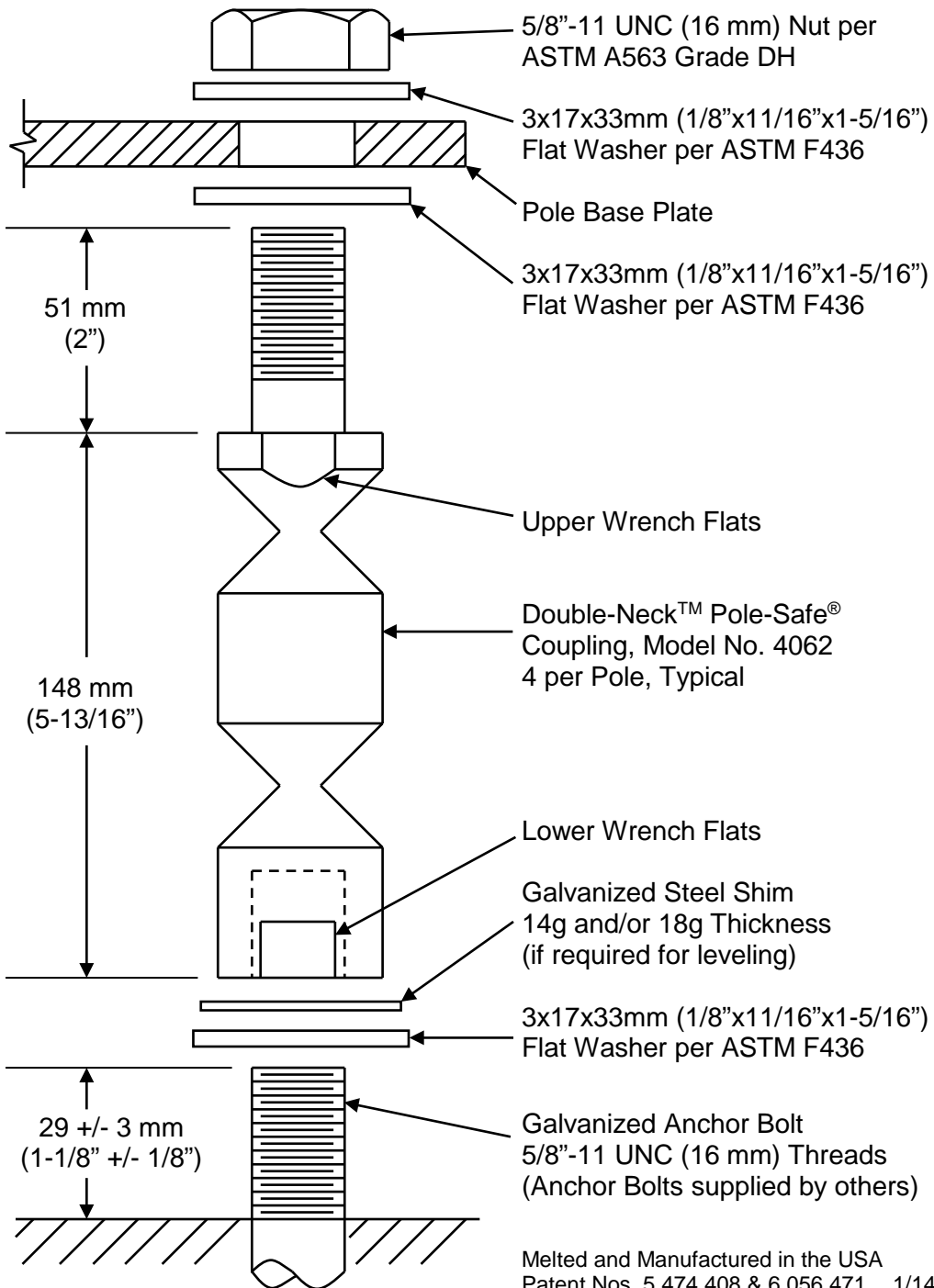
Pole-Safe® Model No. 4050 Breakaway Support System for Light Poles

INSTALLATION INSTRUCTIONS

NOTE: Proper Installation is essential for the Pole-Safe Breakaway Support System to function correctly as designed.

1. Surface of foundation around anchor bolts must be smooth, flat and free of debris.
2. Existing anchor bolts MUST be sized to the proper projection height as shown on the reverse side of these instructions. Then, anchor bolts shall be cleaned, and if necessary, coated with cold galvanizing material prior to installing Pole-Safe couplings.
3. Install lower flat washers, and thread Pole-Safe couplings on to anchor bolts.
4. If needed, shims are provided for leveling of the pole base plate, and may be installed at the base of the coupling(s). No more than 2 shims shall be installed on any one coupling. For larger adjustments that may be required, install no more than one additional flat washer under the base plate, on the top shank of the coupling(s).
5. Use lower wrench flats to tighten Pole-Safe couplings on to the anchor bolts. Secure couplings as tight as possible using conventional wrenches. Do not use a pipe wrench. Couplings must be seated squarely on the washers, and washers must be seated uniformly on top of the foundation. If necessary, remove coupling and reduce the anchor bolt projection height to allow proper seating of the couplings.
6. Install a flat washer on top of each Pole-Safe coupling, and set the pole with base plate on top of the couplings.
7. Install a flat washer and nut on to each Pole-Safe coupling extended through the pole base plate. If pole is not plumb, install shims and/or washers for proper leveling as described in Step 4 above.
8. Tighten each nut on to pole base plate. Pole-Safe couplings must be held with an additional wrench on the upper wrench flats to prevent an induced torque stress across the necked portion of the couplings. Nuts shall be tightened using the turn-of-nut method in accordance with American Institute of Steel Construction (AISC) procedures (for ASTM A325 and A490 anchor bolts, 1/3 rotation past "snug tight").

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Melted and Manufactured in the USA
Patent Nos. 5.474.408 & 6.056.471 1/14

SPECIFICATIONS

Performance Criteria:

1. Double-Neck™ Pole-Safe® conforms to AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals."
2. Double-Neck™ Pole-Safe® has been crash-tested and FHWA approved in accordance with the requirements of NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Physical Properties per Coupling:

1. Ultimate Tensile Strength = 101.9 kN (22.8 kips), minimum.
2. Tensile Yield Strength = 88.3 kN (19.8 kips), minimum.
3. Ultimate Restrained Shear Strength = 6.6 kN (1.5 kips), minimum.
4. Ultimate Restrained Shear Strength = 11.1 kN (2.5 kips), maximum.

Corrosion Protection:

1. All Double-Neck™ Pole-Safe® couplings, nuts, bolts, and washers are galvanized after fabrication in accordance with ASTM A153. All leveling shims are galvanized after fabrication in accordance with ASTM A653.

Pole-Safe® Model No. 4062 Breakaway Support System for Light Poles



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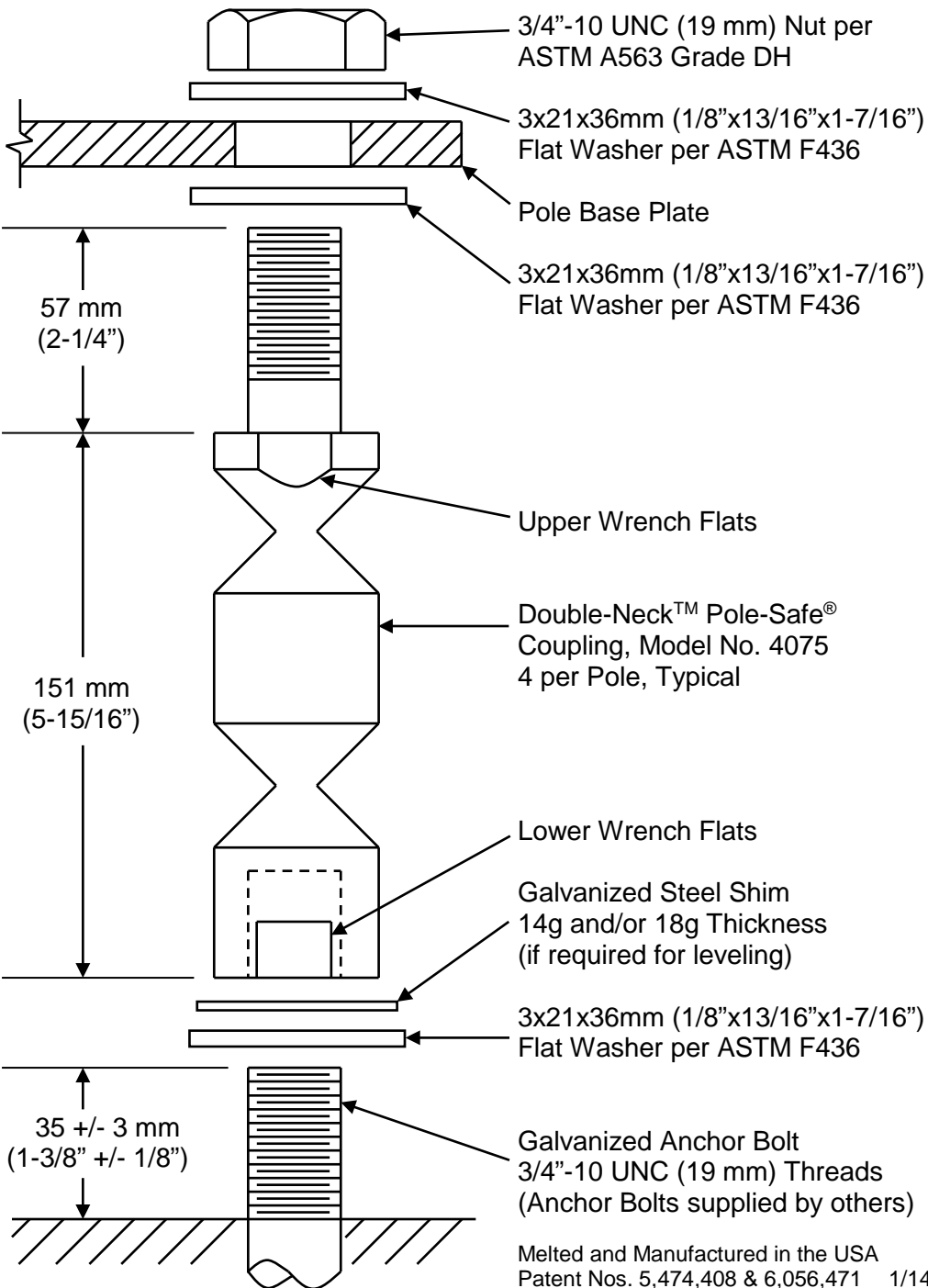
Pole-Safe® Model No. 4062 Breakaway Support System for Light Poles

INSTALLATION INSTRUCTIONS

NOTE: Proper Installation is essential for the Pole-Safe Breakaway Support System to function correctly as designed.

1. Surface of foundation around anchor bolts must be smooth, flat and free of debris.
2. Existing anchor bolts MUST be sized to the proper projection height as shown on the reverse side of these instructions. Then, anchor bolts shall be cleaned, and if necessary, coated with cold galvanizing material prior to installing Pole-Safe couplings.
3. Install lower flat washers, and thread Pole-Safe couplings on to anchor bolts.
4. If needed, shims are provided for leveling of the pole base plate, and may be installed at the base of the coupling(s). No more than 2 shims shall be installed on any one coupling. For larger adjustments that may be required, install no more than one additional flat washer under the base plate, on the top shank of the coupling(s).
5. Use lower wrench flats to tighten Pole-Safe couplings on to the anchor bolts. Secure couplings as tight as possible using conventional wrenches. Do not use a pipe wrench. Couplings must be seated squarely on the washers, and washers must be seated uniformly on top of the foundation. If necessary, remove coupling and reduce the anchor bolt projection height to allow proper seating of the couplings.
6. Install a flat washer on top of each Pole-Safe coupling, and set the pole with base plate on top of the couplings.
7. Install a flat washer and nut on to each Pole-Safe coupling extended through the pole base plate. If pole is not plumb, install shims and/or washers for proper leveling as described in Step 4 above.
8. Tighten each nut on to pole base plate. Pole-Safe couplings must be held with an additional wrench on the upper wrench flats to prevent an induced torque stress across the necked portion of the couplings. Nuts shall be tightened using the turn-of-nut method in accordance with American Institute of Steel Construction (AISC) procedures (for ASTM A325 and A490 anchor bolts, 1/3 rotation past "snug tight").

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Melted and Manufactured in the USA
Patent Nos. 5,474,408 & 6,056,471 1/14

SPECIFICATIONS

Performance Criteria:

1. Double-Neck™ Pole-Safe® conforms to AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals."
2. Double-Neck™ Pole-Safe® has been crash-tested and FHWA approved in accordance with the requirements of NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Physical Properties per Coupling:

1. Ultimate Tensile Strength = 131.0 kN (29.4 kips), minimum.
2. Tensile Yield Strength = 113.6 kN (25.5 kips), minimum.
3. Ultimate Restrained Shear Strength = 8.9 kN (2.0 kips), minimum.
4. Ultimate Restrained Shear Strength = 13.3 kN (3.0 kips), maximum.

Corrosion Protection:

1. All Double-Neck™ Pole-Safe® couplings, nuts, bolts, and washers are galvanized after fabrication in accordance with ASTM A153. All leveling shims are galvanized after fabrication in accordance with ASTM A653.

Pole-Safe® Model No. 4075 Breakaway Support System for Light Poles



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Pole-Safe® Model No. 4075 Breakaway Support System for Light Poles

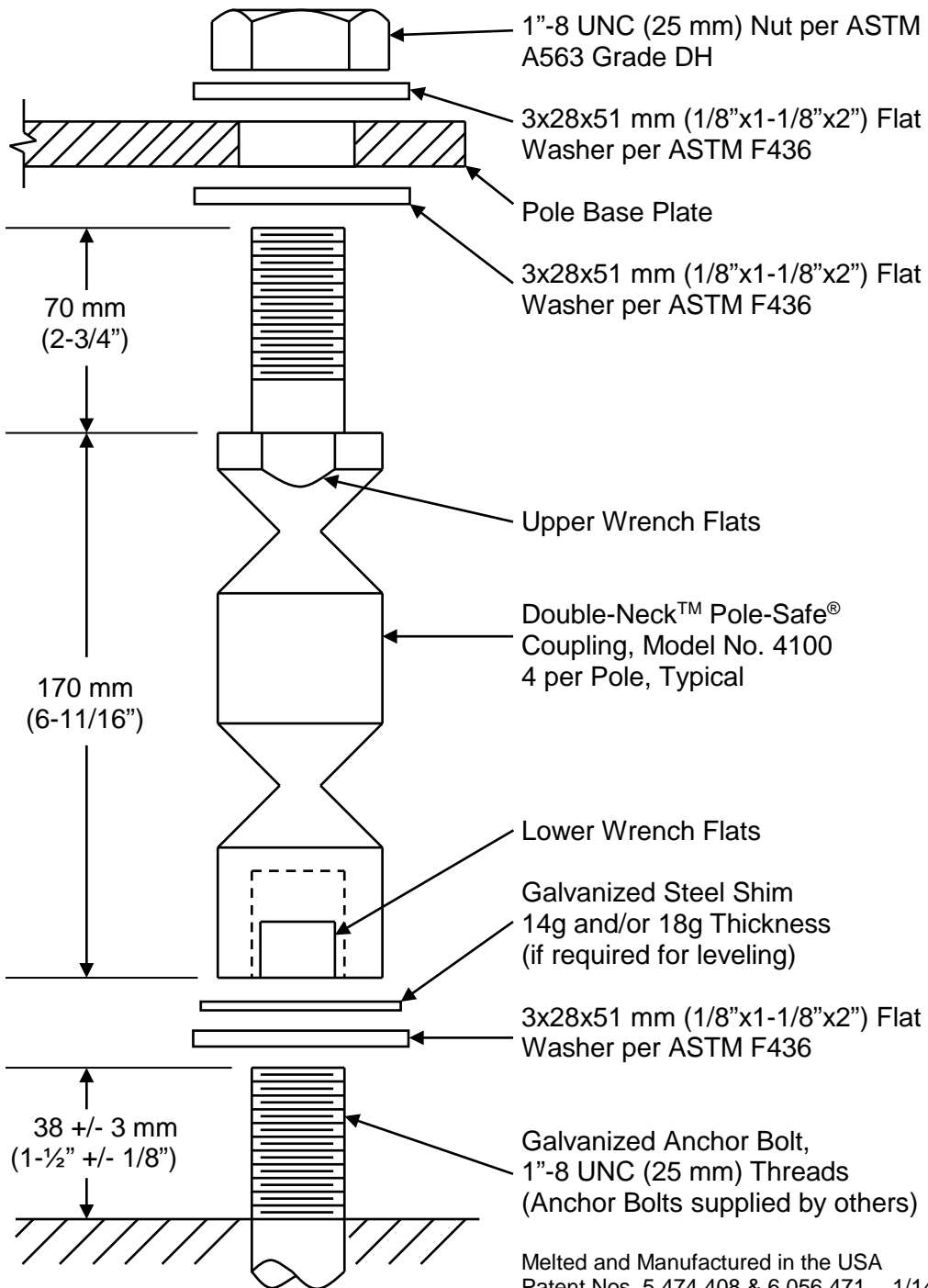
INSTALLATION INSTRUCTIONS

NOTE: Proper Installation is essential for the Pole-Safe Breakaway Support System to function correctly as designed.

1. Surface of foundation around anchor bolts must be smooth, flat and free of debris.
2. Existing anchor bolts MUST be sized to the proper projection height as shown on the reverse side of these instructions. Then, anchor bolts shall be cleaned, and if necessary, coated with cold galvanizing material prior to installing Pole-Safe couplings.
3. Install lower flat washers, and thread Pole-Safe couplings on to anchor bolts.
4. If needed, shims are provided for leveling of the pole base plate, and may be installed at the base of the coupling(s). No more than 2 shims shall be installed on any one coupling. For larger adjustments that may be required, install no more than one additional flat washer under the base plate, on the top shank of the coupling(s).
5. Use lower wrench flats to tighten Pole-Safe couplings on to the anchor bolts. Secure couplings as tight as possible using conventional wrenches. Do not use a pipe wrench. Couplings must be seated squarely on the washers, and washers must be seated uniformly on top of the foundation. If necessary, remove coupling and reduce the anchor bolt projection height to allow proper seating of the couplings.
6. Install a flat washer on top of each Pole-Safe coupling, and set the pole with base plate on top of the couplings.
7. Install a flat washer and nut on to each Pole-Safe coupling extended through the pole base plate. If pole is not plumb, install shims and/or washers for proper leveling as described in Step 4 above.
8. Tighten each nut on to pole base plate. Pole-Safe couplings must be held with an additional wrench on the upper wrench flats to prevent an induced torque stress across the necked portion of the couplings. Nuts shall be tightened using the turn-of-nut method in accordance with American Institute of Steel Construction (AISC) procedures (for ASTM A325 and A490 anchor bolts, 1/3 rotation past "snug tight").

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Melted and Manufactured in the USA
Patent Nos. 5,474,408 & 6,056,471 1/14

SPECIFICATIONS

Performance Criteria:

1. Double-Neck™ Pole-Safe® conforms to AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals."
2. Double-Neck™ Pole-Safe® has been crash-tested and FHWA approved in accordance with the requirements of NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."
3. Maximum Allowable Pole Mass = 450 kg (992 lb.) (total, including fixtures).

Physical Properties per Coupling:

1. Ultimate Tensile Strength = 221.5 kN (49.8 kips), minimum.
2. Tensile Yield Strength = 192.0 kN (43.2 kips), minimum.
3. Ultimate Restrained Shear Strength = 16.9 kN (3.8 kips), minimum.
4. Ultimate Restrained Shear Strength = 24.4 kN (5.5 kips), maximum.

Corrosion Protection:

1. All Double-Neck™ Pole-Safe® couplings, nuts, bolts, and washers are galvanized after fabrication in accordance with ASTM A153. All leveling shims are galvanized after fabrication in accordance with ASTM A653.

Pole-Safe® Model No. 4100 Breakaway Support System for Light Poles



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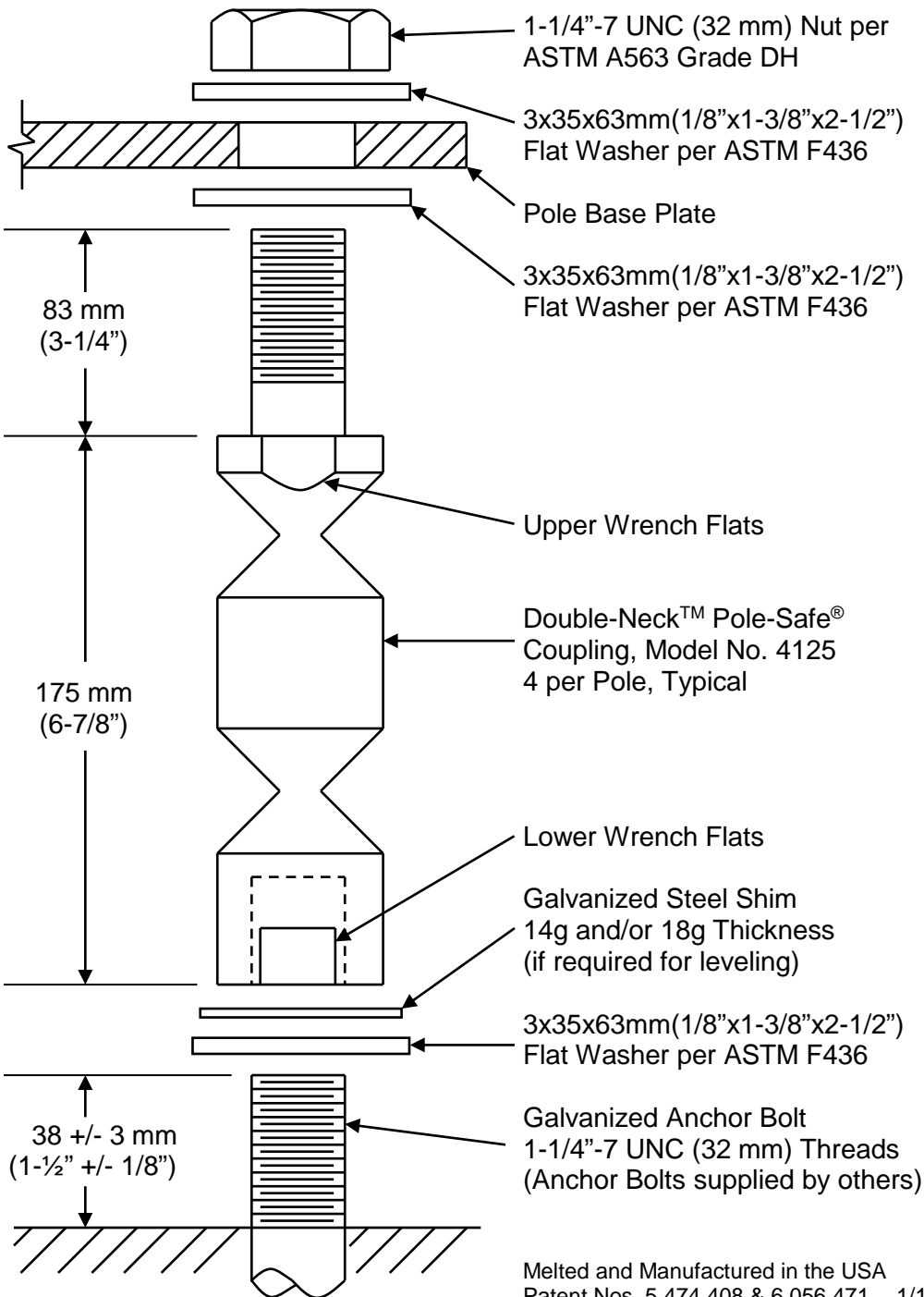
Pole-Safe® Model No. 4100 Breakaway Support System for Light Poles

INSTALLATION INSTRUCTIONS

NOTE: Proper Installation is essential for the Pole-Safe Breakaway Support System to function correctly as designed.

1. Surface of foundation around anchor bolts must be smooth, flat and free of debris.
2. Existing anchor bolts MUST be sized to the proper projection height as shown on the reverse side of these instructions. Then, anchor bolts shall be cleaned, and if necessary, coated with cold galvanizing material prior to installing Pole-Safe couplings.
3. Install lower flat washers, and thread Pole-Safe couplings on to anchor bolts.
4. If needed, shims are provided for leveling of the pole base plate, and may be installed at the base of the coupling(s). No more than 2 shims shall be installed on any one coupling. For larger adjustments that may be required, install no more than one additional flat washer under the base plate, on the top shank of the coupling(s).
5. Use lower wrench flats to tighten Pole-Safe couplings on to the anchor bolts. Secure couplings as tight as possible using conventional wrenches. Do not use a pipe wrench. Couplings must be seated squarely on the washers, and washers must be seated uniformly on top of the foundation. If necessary, remove coupling and reduce the anchor bolt projection height to allow proper seating of the couplings.
6. Install a flat washer on top of each Pole-Safe coupling, and set the pole with base plate on top of the couplings.
7. Install a flat washer and nut on to each Pole-Safe coupling extended through the pole base plate. If pole is not plumb, install shims and/or washers for proper leveling as described in Step 4 above.
8. Tighten each nut on to pole base plate. Pole-Safe couplings must be held with an additional wrench on the upper wrench flats to prevent an induced torque stress across the necked portion of the couplings. Nuts shall be tightened using the turn-of-nut method in accordance with American Institute of Steel Construction (AISC) procedures (for ASTM A325 and A490 anchor bolts, 1/3 rotation past "snug tight").

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Melted and Manufactured in the USA
 Patent Nos. 5,474,408 & 6,056,471 1/14

SPECIFICATIONS

Performance Criteria:

1. Double-Neck™ Pole-Safe® conforms to AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals."
2. Double-Neck™ Pole-Safe® has been crash-tested and FHWA approved in accordance with the requirements of NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."
3. Maximum Allowable Pole Mass = 450 kg (992 lb) (total, including fixtures).

Physical Properties per Coupling:

1. Ultimate Tensile Strength = 221.5 kN (49.8 kips), minimum.
2. Tensile Yield Strength = 192.0 kN (43.2 kips), minimum.
3. Ultimate Restrained Shear Strength = 16.9 kN (3.8 kips), minimum.
4. Ultimate Restrained Shear Strength = 24.4 kN (5.5 kips), maximum.

Corrosion Protection:

1. All Double-Neck™ Pole-Safe® couplings, nuts, bolts, and washers are galvanized after fabrication in accordance with ASTM A153. All leveling shims are galvanized after fabrication in accordance with ASTM A653.

Pole-Safe® Model No. 4125 Breakaway Support System for Light Poles



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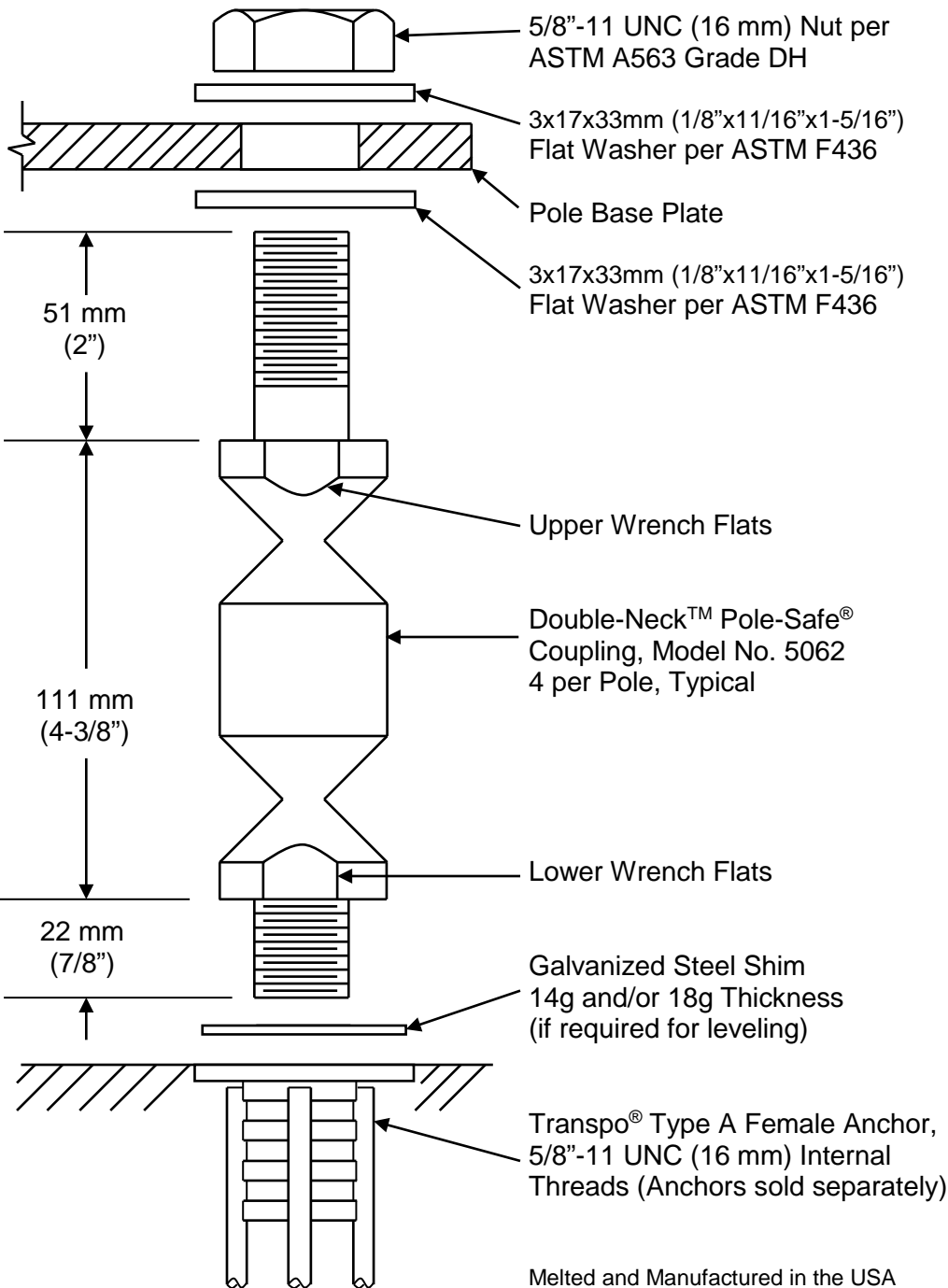
Pole-Safe® Model No. 4125 Breakaway Support System for Light Poles

INSTALLATION INSTRUCTIONS

NOTE: Proper Installation is essential for the Pole-Safe Breakaway Support System to function correctly as designed.

1. Surface of foundation around anchor bolts must be smooth, flat and free of debris.
2. Existing anchor bolts MUST be sized to the proper projection height as shown on the reverse side of these instructions. Then, anchor bolts shall be cleaned, and if necessary, coated with cold galvanizing material prior to installing Pole-Safe couplings.
3. Install lower flat washers, and thread Pole-Safe couplings on to anchor bolts.
4. If needed, shims are provided for leveling of the pole base plate, and may be installed at the base of the coupling(s). No more than 2 shims shall be installed on any one coupling. For larger adjustments that may be required, install no more than one additional flat washer under the base plate, on the top shank of the coupling(s).
5. Use lower wrench flats to tighten Pole-Safe couplings on to the anchor bolts. Secure couplings as tight as possible using conventional wrenches. Do not use a pipe wrench. Couplings must be seated squarely on the washers, and washers must be seated uniformly on top of the foundation. If necessary, remove coupling and reduce the anchor bolt projection height to allow proper seating of the couplings.
6. Install a flat washer on top of each Pole-Safe coupling, and set the pole with base plate on top of the couplings.
7. Install a flat washer and nut on to each Pole-Safe coupling extended through the pole base plate. If pole is not plumb, install shims and/or washers for proper leveling as described in Step 4 above.
8. Tighten each nut on to pole base plate. Pole-Safe couplings must be held with an additional wrench on the upper wrench flats to prevent an induced torque stress across the necked portion of the couplings. Nuts shall be tightened using the turn-of-nut method in accordance with American Institute of Steel Construction (AISC) procedures (for ASTM A325 and A490 anchor bolts, 1/3 rotation past "snug tight").

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Melted and Manufactured in the USA
Patent Nos. 5,474,408 & 6,056,471 1/14

SPECIFICATIONS

Performance Criteria:

1. Double-Neck™ Pole-Safe® conforms to AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals."
2. Double-Neck™ Pole-Safe® has been crash-tested and FHWA approved in accordance with the requirements of NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Physical Properties per Coupling:

1. Ultimate Tensile Strength = 101.9 kN (22.8 kips), minimum.
2. Tensile Yield Strength = 88.3 kN (19.8 kips), minimum.
3. Ultimate Restrained Shear Strength = 6.6 kN (1.5 kips), minimum.
4. Ultimate Restrained Shear Strength = 11.1 kN (2.5 kips), maximum.

Corrosion Protection:

1. All Double-Neck™ Pole-Safe® couplings, nuts, bolts, and washers are galvanized after fabrication in accordance with ASTM A153. All leveling shims are galvanized after fabrication in accordance with ASTM A653.

Pole-Safe® Model No. 5062 Breakaway Support System for Light Poles



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Pole-Safe® Model No. 5062 Breakaway Support System for Light Poles

INSTALLATION INSTRUCTIONS

NOTE: Proper Installation is essential for the Pole-Safe Breakaway Support System to function correctly as designed.

Anchor Assembly:

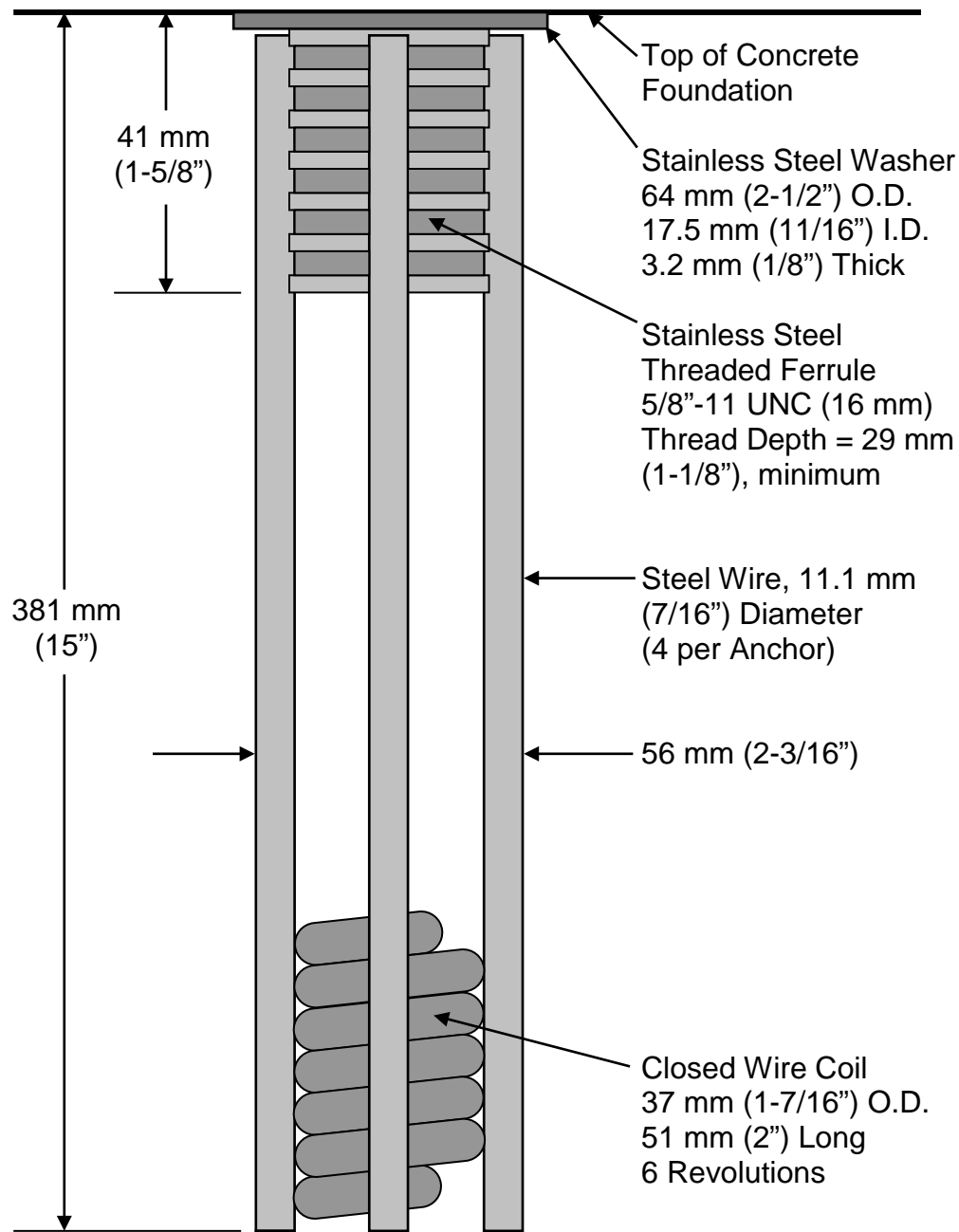
1. Fasten Transpo® Type A Female Anchors to a rigid template pre-fabricated to match the specified bolt circle.
2. Lower entire anchor assembly into the fresh concrete foundation, and vibrate assembly into place, such that the anchors are in the proper location to match the holes in the pole base plate. Ensure that all anchors are level and that the tops of the individual anchors and the bottom of the template are flush with the finished top surface of the foundation.
3. Allow foundation to fully cure, and remove template from the anchors.

Coupling Assembly:

1. Surface of foundation around anchors must be smooth, flat and free of debris.
2. Thread Pole-Safe couplings into Transpo® Type A Female Anchors.
3. If needed, shims are provided for leveling of the pole base plate, and may be installed at the base of the coupling(s). No more than 2 shims shall be installed on any one coupling. For larger adjustments that may be required, install no more than one additional flat washer under the base plate, on the top shank of the coupling(s).
4. Use lower wrench flats to tighten Pole-Safe couplings into the anchors. Secure couplings as tight as possible using conventional wrenches. Do not use a pipe wrench. Couplings must be seated squarely on top of the anchors.
5. Install a flat washer on top of each Pole-Safe coupling, and set the pole with base plate on top of the couplings.
6. Install a flat washer and nut on to each coupling extended through the pole base plate. If pole is not plumb, install shims and/or washers for proper leveling as described in Step 3 above.
7. Tighten each nut on to pole base plate. Pole-Safe couplings must be held with an additional wrench on the upper wrench flats to prevent an induced torque stress across the necked portion of the couplings. Nuts shall be tightened using the turn-of-nut method in accordance with American Institute of Steel Construction (AISC) procedures (1/3 rotation past "snug tight").

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Melted and Manufactured in the USA

1/14

SPECIFICATIONS

Physical Properties:

1. Ultimate Tensile Load = 267 kN (60.0 kips) minimum per Anchor.
2. Actual Pullout Strength depends on foundation design and concrete properties.

Installation Instructions:

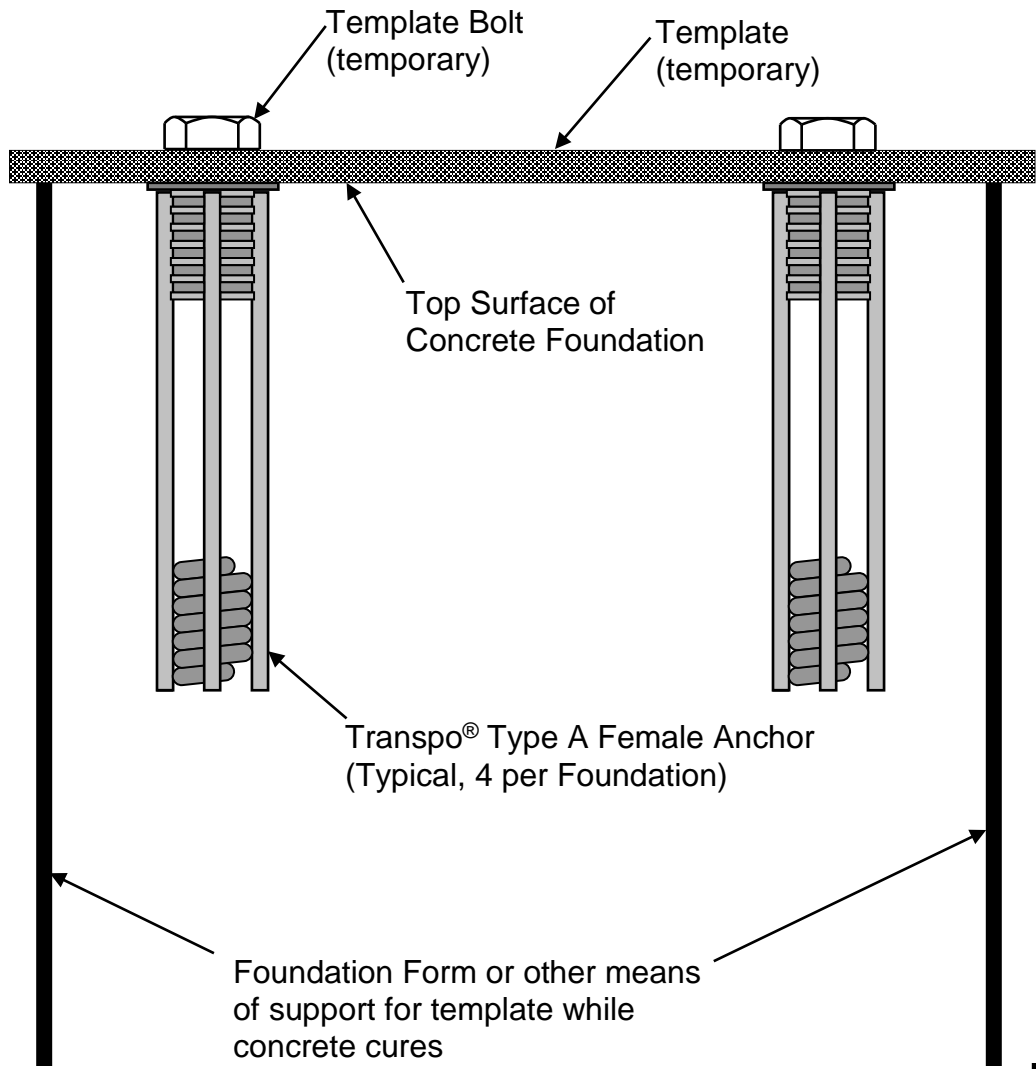
See other side of page for typical installation diagrams.

1. Fabricate a flat steel template with four (4) 16 mm (5/8") diameter holes located to match the specified bolt pattern of the Break-Safe brackets attached to the signpost.
2. Attach four (4) Break-Safe® Type A Female Anchors to template using four (4) 16 mm (5/8") diameter bolts. Ensure that each Anchor Washer is flush and snug against the bottom of the template.
3. Lower Anchor Assembly into fresh concrete foundation, and vibrate into position such that the tops of the Anchor Washers are flush with the finished top surface of the foundation.
4. Support template such that all Anchors are level and in their proper locations.
5. Allow concrete to cure, and then remove bolts and template from the top of the foundation.

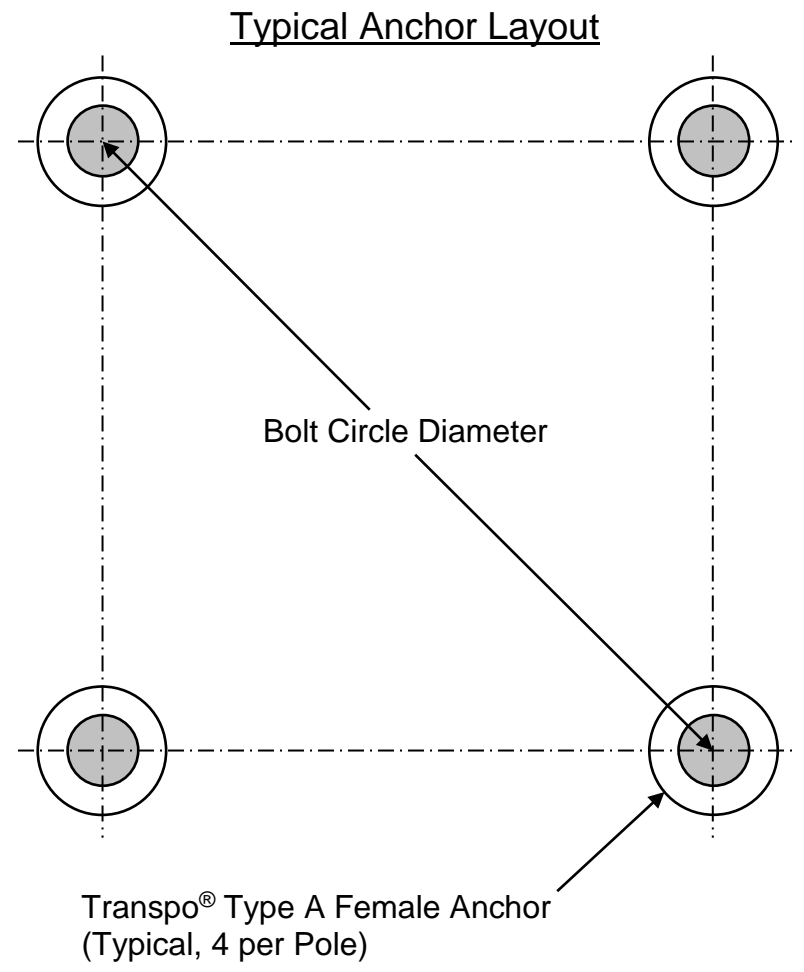
Transpo® Type A Female Anchor
for use with Pole-Safe® Model No. 5062
Breakaway Support System for Light Poles



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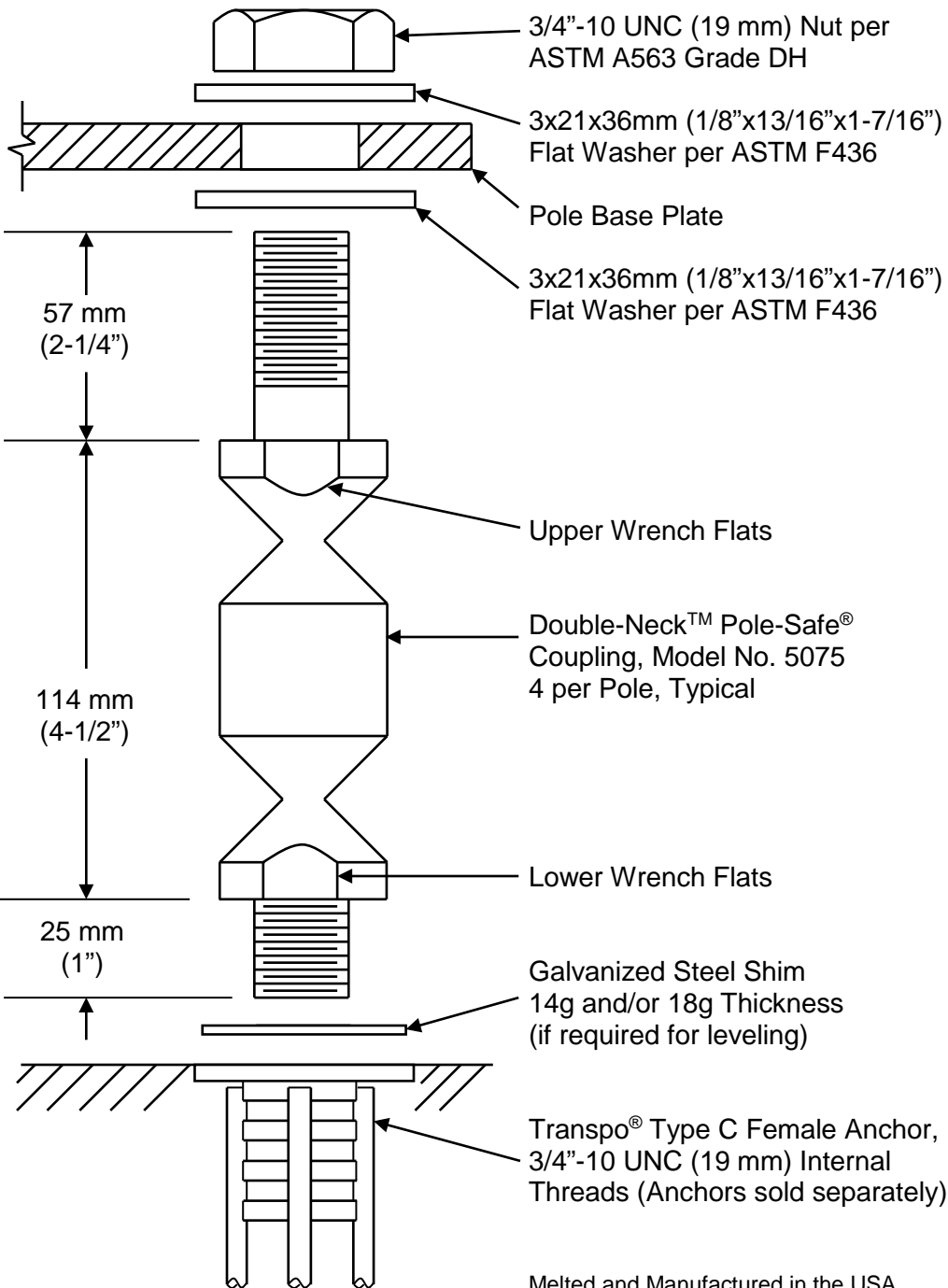
See other side of page for complete Installation Instructions



Transpo® Type A Female Anchor
 for use with Pole-Safe® Model No. 5062
 Breakaway Support System for Light Poles



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Melted and Manufactured in the USA
 Patent Nos. 5,474,408 & 6,056,471 1/14

SPECIFICATIONS

Performance Criteria:

1. Double-Neck™ Pole-Safe® conforms to AASHTO “Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.”
2. Double-Neck™ Pole-Safe® has been crash-tested and FHWA approved in accordance with the requirements of NCHRP Report 350, “Recommended Procedures for the Safety Performance Evaluation of Highway Features.”

Physical Properties per Coupling:

1. Ultimate Tensile Strength = 131.0 kN (29.4 kips), minimum.
2. Tensile Yield Strength = 113.6 kN (25.5 kips), minimum.
3. Ultimate Restrained Shear Strength = 8.9 kN (2.0 kips), minimum.
4. Ultimate Restrained Shear Strength = 13.3 kN (3.0 kips), maximum.

Corrosion Protection:

1. All Double-Neck™ Pole-Safe® couplings, nuts, bolts, and washers are galvanized after fabrication in accordance with ASTM A153. All leveling shims are galvanized after fabrication in accordance with ASTM A653.

Pole-Safe® Model No. 5075 Breakaway Support System for Light Poles



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Pole-Safe® Model No. 5075 Breakaway Support System for Light Poles

INSTALLATION INSTRUCTIONS

NOTE: Proper Installation is essential for the Pole-Safe Breakaway Support System to function correctly as designed.

Anchor Assembly:

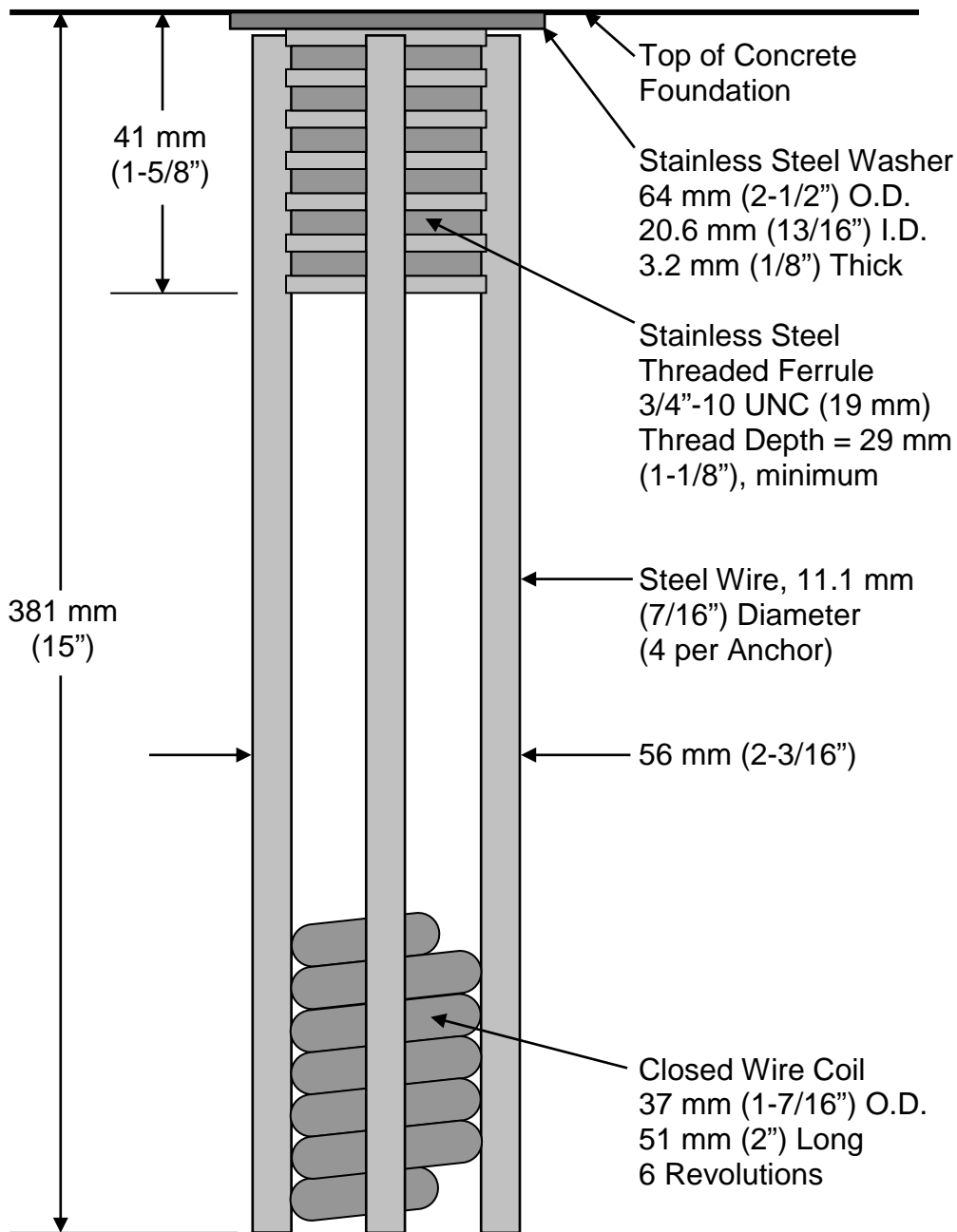
1. Fasten Transpo® Type C Female Anchors to a rigid template pre-fabricated to match the specified bolt circle.
2. Lower entire anchor assembly into the fresh concrete foundation, and vibrate assembly into place, such that the anchors are in the proper location to match the holes in the pole base plate. Ensure that all anchors are level and that the tops of the individual anchors and the bottom of the template are flush with the finished top surface of the foundation.
3. Allow foundation to fully cure, and remove template from the anchors.

Coupling Assembly:

1. Surface of foundation around anchors must be smooth, flat and free of debris.
2. Thread Pole-Safe couplings into Transpo® Type C Female Anchors.
3. If needed, shims are provided for leveling of the pole base plate, and may be installed at the base of the coupling(s). No more than 2 shims shall be installed on any one coupling. For larger adjustments that may be required, install no more than one additional flat washer under the base plate, on the top shank of the coupling(s).
4. Use lower wrench flats to tighten Pole-Safe couplings into the anchors. Secure couplings as tight as possible using conventional wrenches. Do not use a pipe wrench. Couplings must be seated squarely on top of the anchors.
5. Install a flat washer on top of each Pole-Safe coupling, and set the pole with base plate on top of the couplings.
6. Install a flat washer and nut on to each coupling extended through the pole base plate. If pole is not plumb, install shims and/or washers for proper leveling as described in Step 3 above.
7. Tighten each nut on to pole base plate. Pole-Safe couplings must be held with an additional wrench on the upper wrench flats to prevent an induced torque stress across the necked portion of the couplings. Nuts shall be tightened using the turn-of-nut method in accordance with American Institute of Steel Construction (AISC) procedures (1/3 rotation past “snug tight”).

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SPECIFICATIONS

Physical Properties:

1. Ultimate Tensile Load = 266.9 kN (60.0 kips) minimum per Anchor.
2. Actual Pullout Strength depends on foundation design and concrete properties.

Installation Instructions:

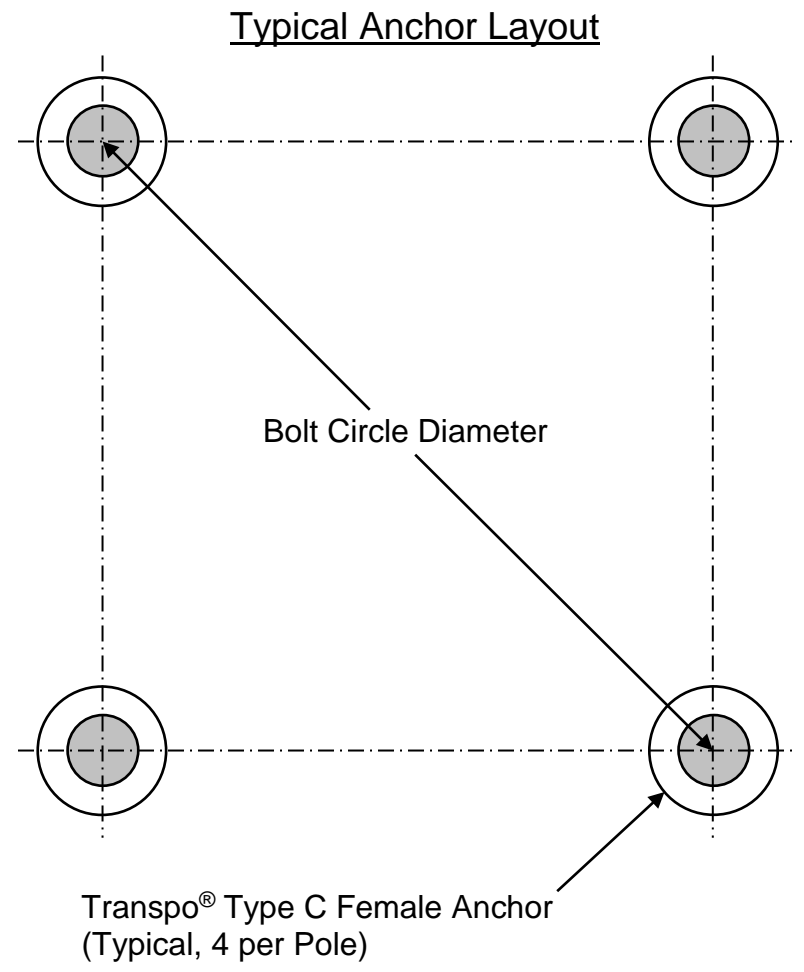
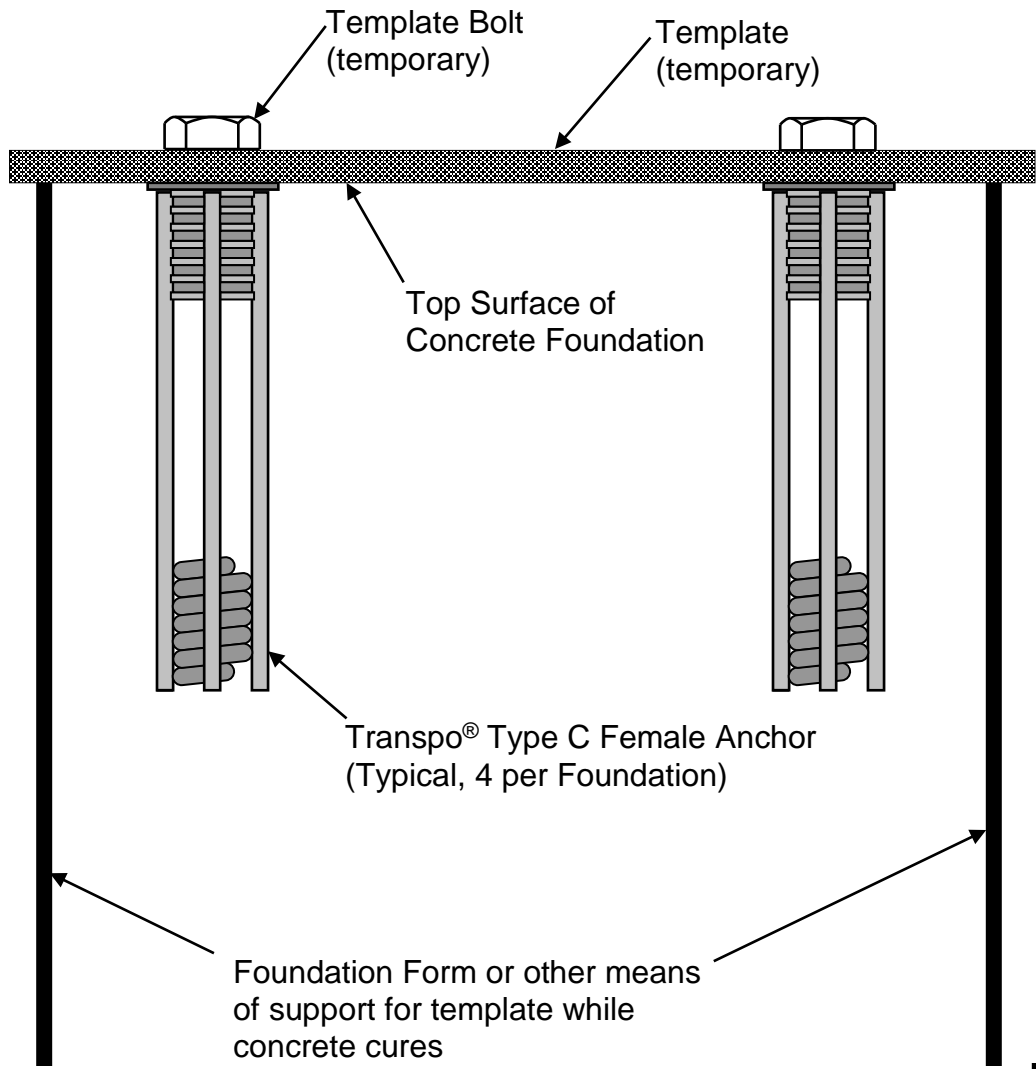
See other side of page for typical installation diagrams.

1. Fabricate flat steel or wood template with four (4) 19 mm (3/4") diameter holes located to match the specified bolt pattern of the pole base plate.
2. Attach four (4) Pole-Safe® Type C Female Anchors to template using four (4) 19 mm (3/4") diameter bolts. Ensure that each Anchor Washer is flush and snug against the bottom of the template.
3. Lower Anchor Assembly into fresh concrete foundation, and vibrate into position such that the tops of the Anchor Washers are flush with the finished top surface of the foundation.
4. Support template such that all Anchors are level and in their proper locations.
5. Allow concrete to cure, and then remove bolts and template from the top of the foundation.

Transpo® Type C Female Anchor
for use with Pole-Safe® Model No. 5075
Breakaway Support System for Light Poles



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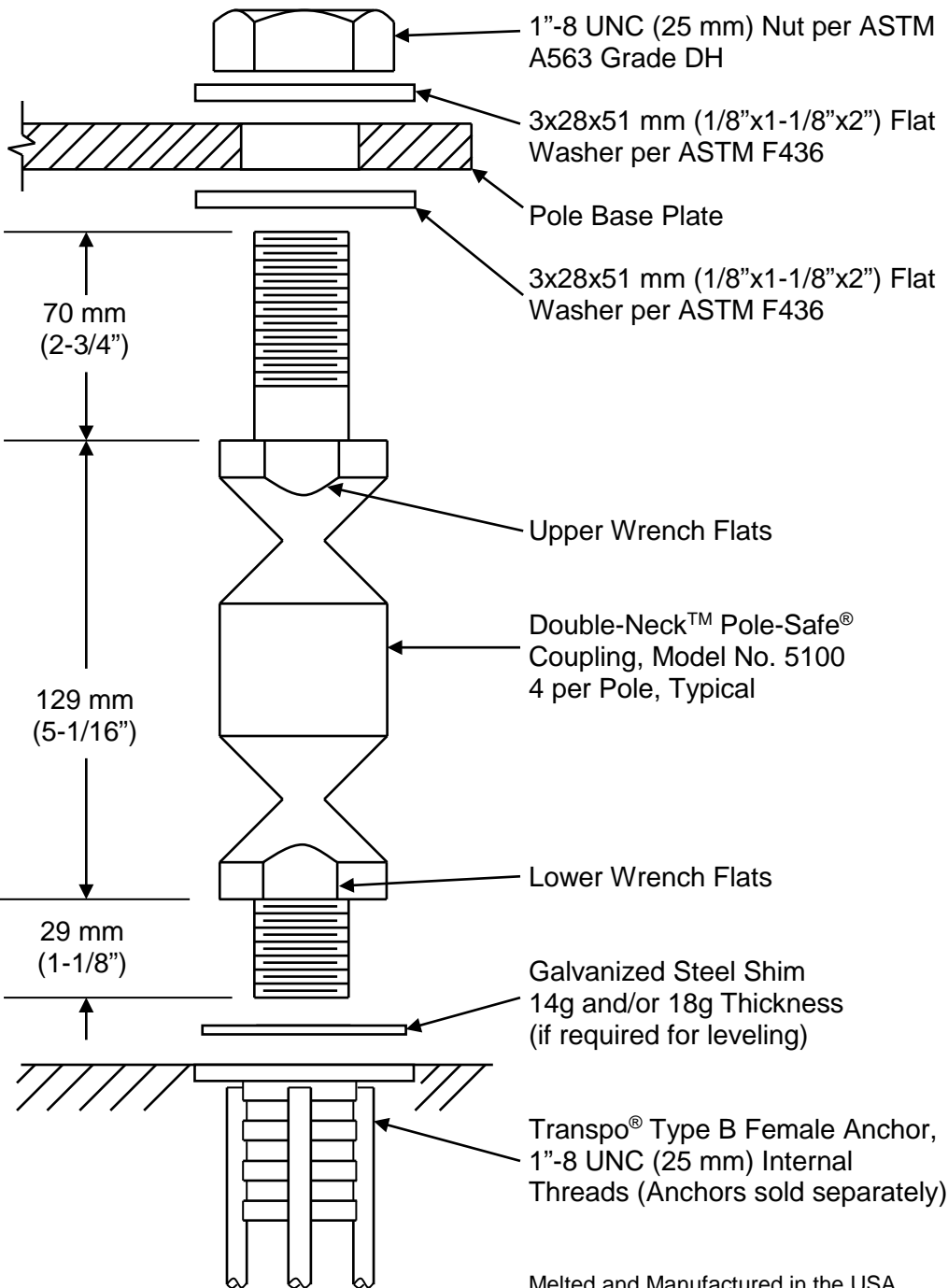


See other side of page for complete Installation Instructions

Transpo® Type C Female Anchor
 for use with Pole-Safe® Model No. 5075
 Breakaway Support System for Light Poles



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Melted and Manufactured in the USA
Patent Nos. 5,474,408 & 6,056,471 1/14

SPECIFICATIONS

Performance Criteria:

1. Double-Neck™ Pole-Safe® conforms to AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals."
2. Double-Neck™ Pole-Safe® has been crash-tested and FHWA approved in accordance with the requirements of NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."
3. Maximum Allowable Pole Mass = 450 kg (992 lb) (total, including fixtures).

Physical Properties per Coupling:

1. Ultimate Tensile Strength = 221.5 kN (49.8 kips), minimum.
2. Tensile Yield Strength = 192.0 kN (43.2 kips), minimum.
3. Ultimate Restrained Shear Strength = 16.9 kN (3.8 kips), minimum.
4. Ultimate Restrained Shear Strength = 24.4 kN (5.5 kips), maximum.

Corrosion Protection:

1. All Double-Neck™ Pole-Safe® couplings, nuts, bolts, and washers are galvanized after fabrication in accordance with ASTM A153. All leveling shims are galvanized after fabrication in accordance with ASTM A653.

Pole-Safe® Model No. 5100 Breakaway Support System for Light Poles



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Pole-Safe® Model No. 5100 Breakaway Support System for Light Poles

INSTALLATION INSTRUCTIONS

NOTE: Proper Installation is essential for the Pole-Safe Breakaway Support System to function correctly as designed.

Anchor Assembly:

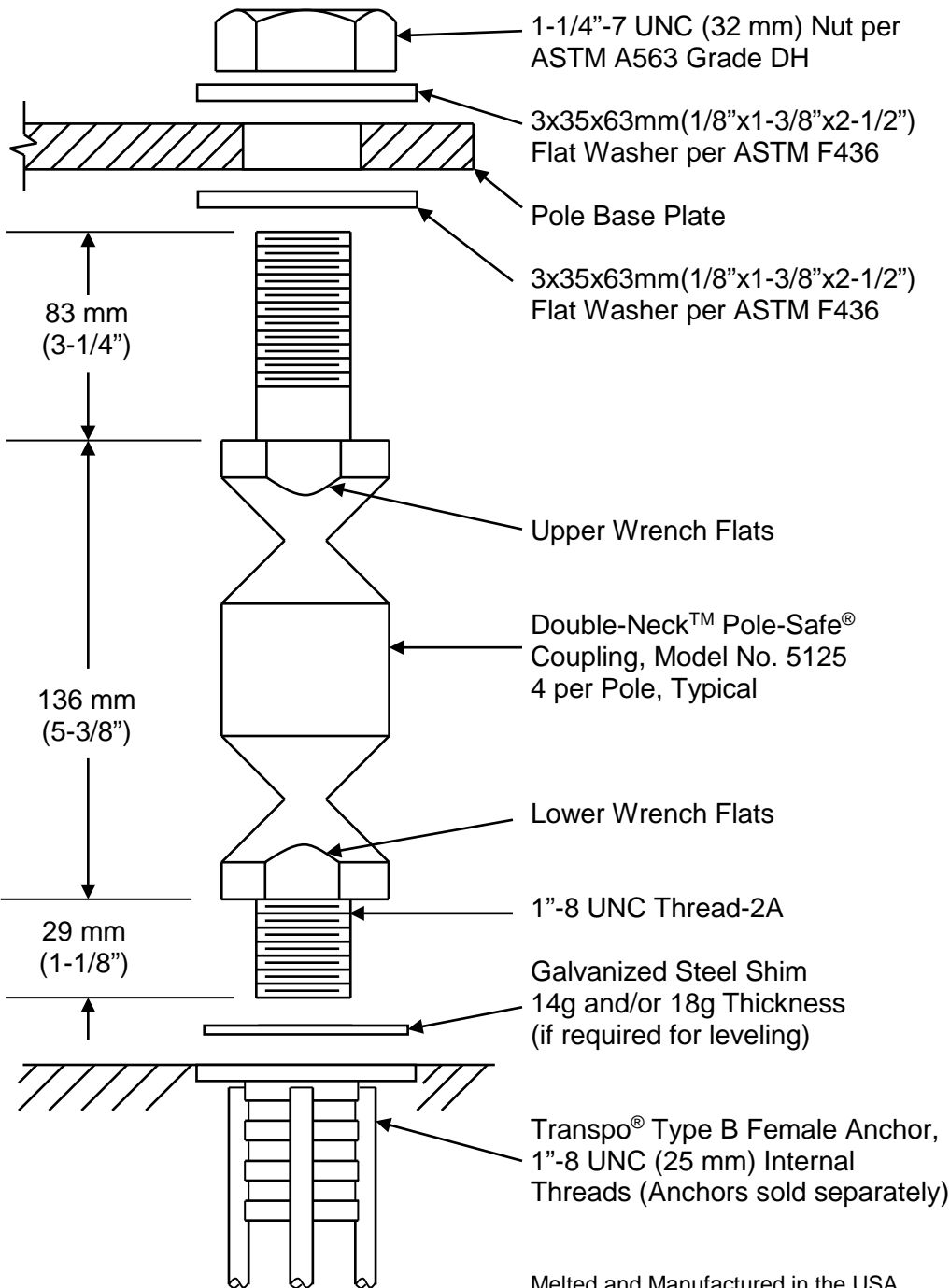
1. Fasten Transpo® Type B Female Anchors to a rigid template pre-fabricated to match the specified bolt circle.
2. Lower entire anchor assembly into the fresh concrete foundation, and vibrate assembly into place, such that the anchors are in the proper location to match the holes in the pole base plate. Ensure that all anchors are level and that the tops of the individual anchors and the bottom of the template are flush with the finished top surface of the foundation.
3. Allow foundation to fully cure, and remove template from the anchors.

Coupling Assembly:

1. Surface of foundation around anchors must be smooth, flat and free of debris.
2. Thread Pole-Safe couplings into Transpo® Type B Female Anchors.
3. If needed, shims are provided for leveling of the pole base plate, and may be installed at the base of the coupling(s). No more than 2 shims shall be installed on any one coupling. For larger adjustments that may be required, install no more than one additional flat washer under the base plate, on the top shank of the coupling(s).
4. Use lower wrench flats to tighten Pole-Safe couplings into the anchors. Secure couplings as tight as possible using conventional wrenches. Do not use a pipe wrench. Couplings must be seated squarely on top of the anchors.
5. Install a flat washer on top of each Pole-Safe coupling, and set the pole with base plate on top of the couplings.
6. Install a flat washer and nut on to each coupling extended through the pole base plate. If pole is not plumb, install shims and/or washers for proper leveling as described in Step 3 above.
7. Tighten each nut on to pole base plate. Pole-Safe couplings must be held with an additional wrench on the upper wrench flats to prevent an induced torque stress across the necked portion of the couplings. Nuts shall be tightened using the turn-of-nut method in accordance with American Institute of Steel Construction (AISC) procedures (1/3 rotation past “snug tight”).

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Patent Nos. 5,474,408 & 6,056,471 1/14

SPECIFICATIONS

Performance Criteria:

1. Double-Neck™ Pole-Safe® conforms to AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals."
2. Double-Neck™ Pole-Safe® has been crash-tested and FHWA approved in accordance with the requirements of NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."
3. Maximum Allowable Pole Mass = 450 kg (992 lb.) (total, including fixtures).

Physical Properties per Coupling:

1. Ultimate Tensile Strength = 221.5 kN (49.8 kips), minimum.
2. Tensile Yield Strength = 192.0 kN (43.2 kips), minimum.
3. Ultimate Restrained Shear Strength = 16.9 kN (3.8 kips), minimum.
4. Ultimate Restrained Shear Strength = 24.4 kN (5.5 kips), maximum.

Corrosion Protection:

1. All Double-Neck™ Pole-Safe® couplings, nuts, bolts, and washers are galvanized after fabrication in accordance with ASTM A153. All leveling shims are galvanized after fabrication in accordance with ASTM A653.

Pole-Safe® Model No. 5125 Breakaway Support System for Light Poles



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Pole-Safe® Model No. 5125
Breakaway Support System for Light Poles

INSTALLATION INSTRUCTIONS

NOTE: Proper Installation is essential for the Pole-Safe Breakaway Support System to function correctly as designed.

Anchor Assembly:

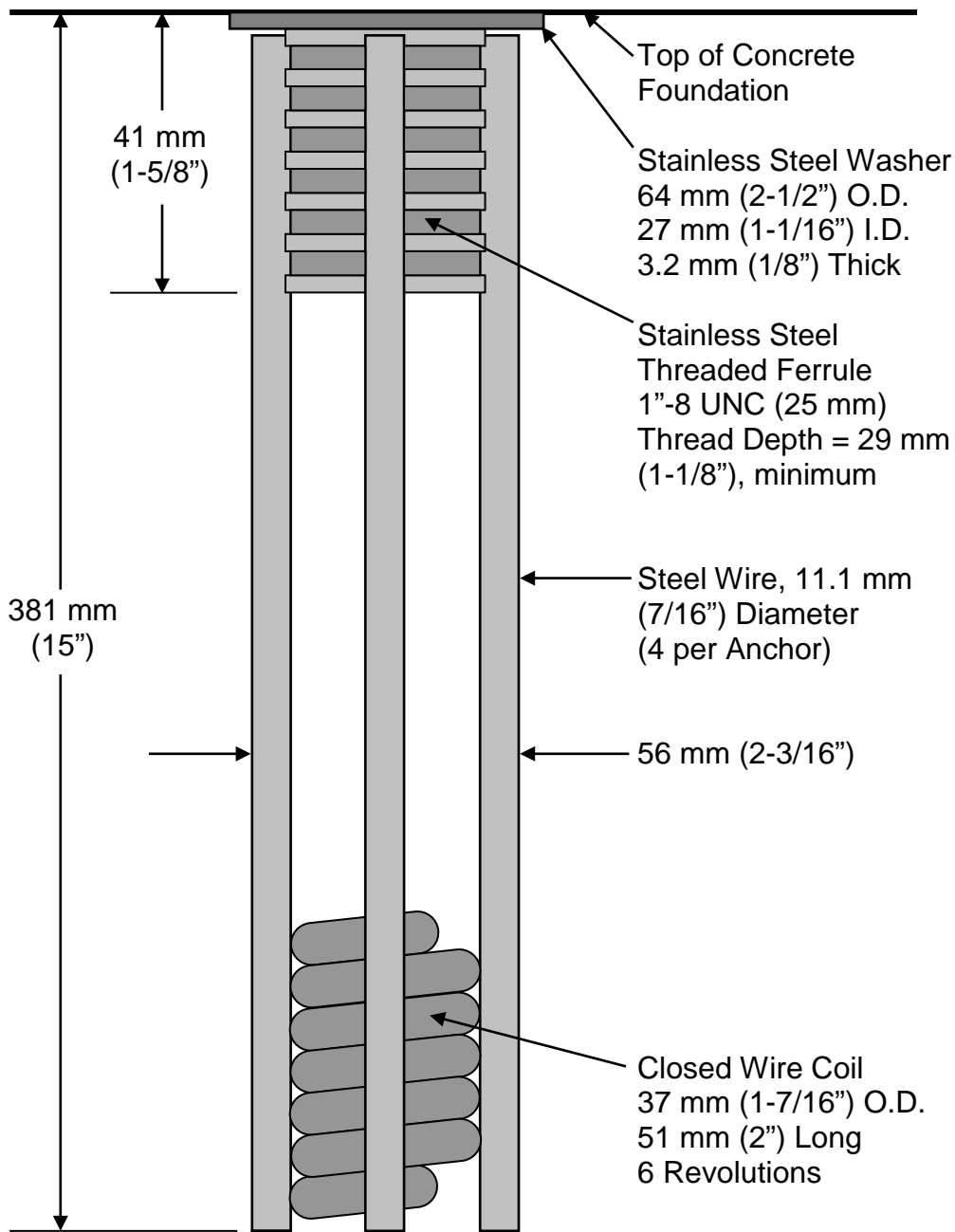
1. Fasten Transpo® Type B Female Anchors to a rigid template pre-fabricated to match the specified bolt circle.
2. Lower entire anchor assembly into the fresh concrete foundation, and vibrate assembly into place, such that the anchors are in the proper location to match the holes in the pole base plate. Ensure that all anchors are level and that the tops of the individual anchors and the bottom of the template are flush with the finished top surface of the foundation.
3. Allow foundation to fully cure, and remove template from the anchors.

Coupling Assembly:

1. Surface of foundation around anchors must be smooth, flat and free of debris.
2. Thread Pole-Safe couplings into Transpo® Type B Female Anchors.
3. If needed, shims are provided for leveling of the pole base plate, and may be installed at the base of the coupling(s). No more than 2 shims shall be installed on any one coupling. For larger adjustments that may be required, install no more than one additional flat washer under the base plate, on the top shank of the coupling(s).
4. Use lower wrench flats to tighten Pole-Safe couplings into the anchors. Secure couplings as tight as possible using conventional wrenches. Do not use a pipe wrench. Couplings must be seated squarely on top of the anchors.
5. Install a flat washer on top of each Pole-Safe coupling, and set the pole with base plate on top of the couplings.
6. Install a flat washer and nut on to each coupling extended through the pole base plate. If pole is not plumb, install shims and/or washers for proper leveling as described in Step 3 above.
7. Tighten each nut on to pole base plate. Pole-Safe couplings must be held with an additional wrench on the upper wrench flats to prevent an induced torque stress across the necked portion of the couplings. Nuts shall be tightened using the turn-of-nut method in accordance with American Institute of Steel Construction (AISC) procedures (1/3 rotation past “snug tight”).

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SPECIFICATIONS

Physical Properties:

1. Ultimate Tensile Load = 267 kN (60.0 kips) minimum per Anchor.
2. Actual Pullout Strength depends on foundation design and concrete properties.

Installation Instructions:

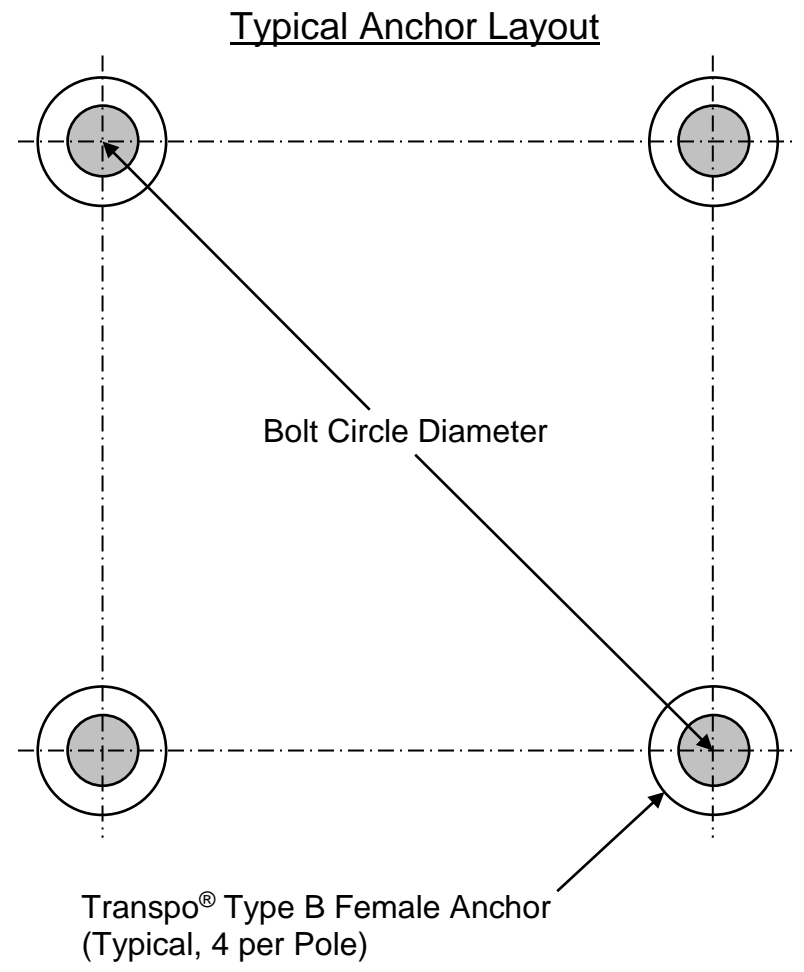
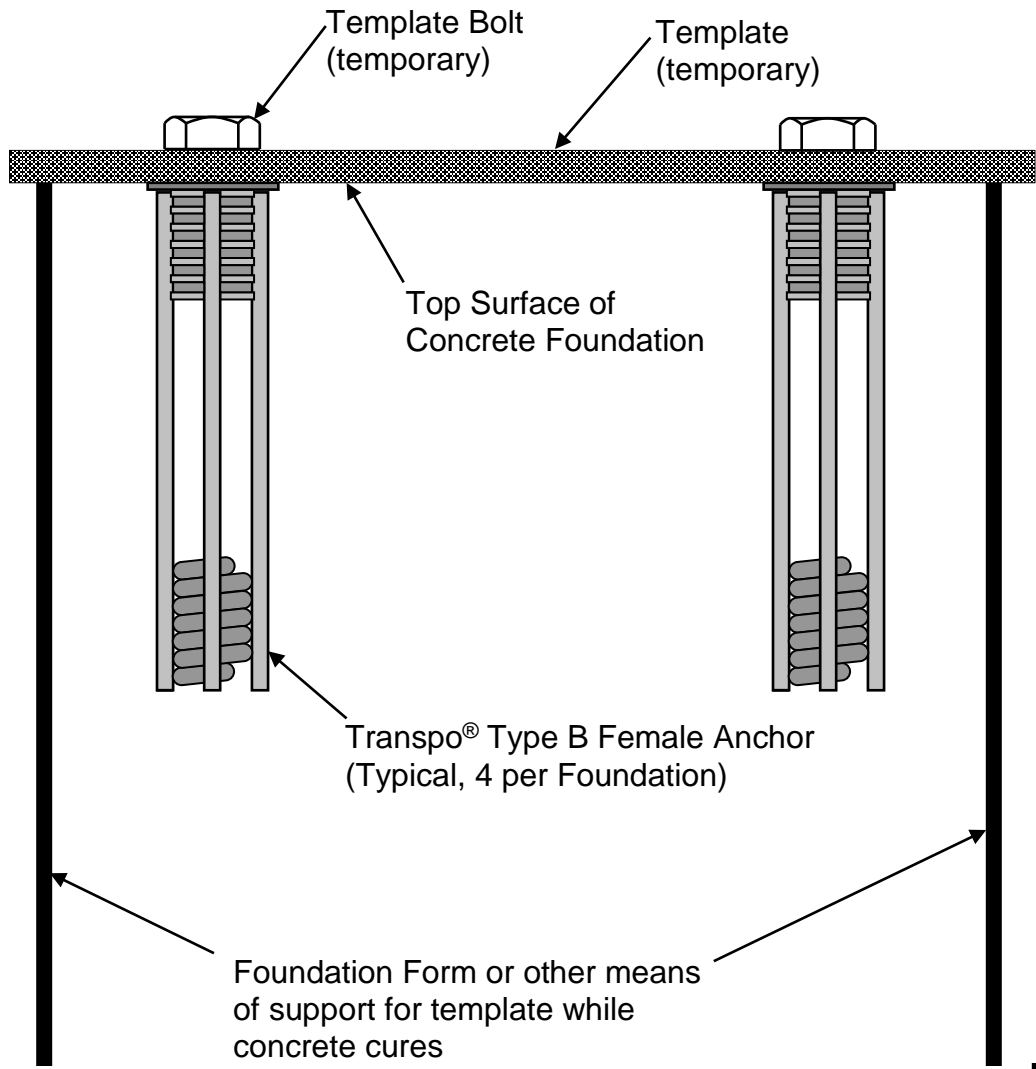
See other side of page for typical installation diagrams.

1. Fabricate flat steel or wood template with four (4) 25 mm (1") diameter holes located to match the specified bolt pattern of the Break-Safe brackets attached to the signpost.
2. Attach four (4) Break-Safe® Type B Female Anchors to template using four (4) 25 mm (1") diameter bolts. Ensure that each Anchor Washer is flush and snug against the bottom of the template.
3. Lower Anchor Assembly into fresh concrete foundation, and vibrate into position such that the tops of the Anchor Washers are flush with the finished top surface of the foundation.
4. Support template such that all Anchors are level and in their proper locations.
5. Allow concrete to cure, and then remove bolts and template from the top of the foundation.

Transpo® Type B Female Anchor
for use with Pole Safe® Model No. 5100 and 5125
Breakaway Support System for Light Poles



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See other side of page for complete Installation Instructions

Transpo® Type B Female Anchor
 for use with Pole-Safe® Model No. 5100 and 5125
 Breakaway Support System for Light Poles



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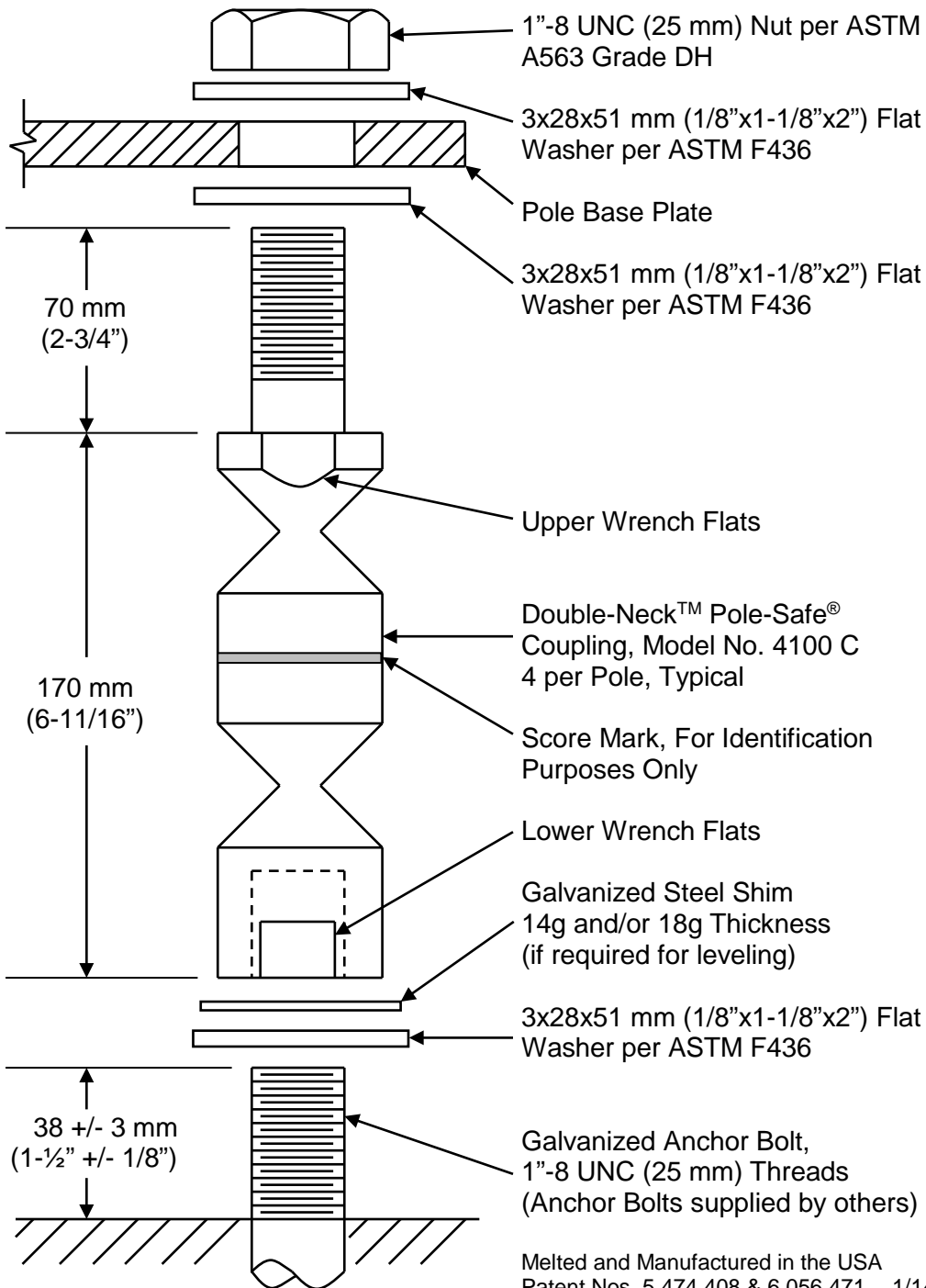
Pole-Safe Breakaway Support System for Call Box Poles



CALL
BOX
A64.60

HELP

A646



Melted and Manufactured in the USA
 Patent Nos. 5,474,408 & 6,056,471 1/14

SPECIFICATIONS

Performance Criteria:

1. Double-Neck™ Pole-Safe® conforms to AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals."
2. Double-Neck™ Pole-Safe® has been crash-tested and FHWA approved in accordance with the requirements of NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Physical Properties per Coupling:

1. Ultimate Tensile Strength = 158.7 kN (35.7 kips), minimum.
2. Tensile Yield Strength = 137.5 kN (30.9 kips), minimum.
3. Ultimate Restrained Shear Strength = 12.0 kN (2.7 kips), minimum.
4. Ultimate Restrained Shear Strength = 17.8 kN (4.0 kips), maximum.

Corrosion Protection:

1. All Double-Neck™ Pole-Safe® couplings, nuts, bolts, and washers are galvanized after fabrication in accordance with ASTM A153. All leveling shims are galvanized after fabrication in accordance with ASTM A653.

Pole-Safe® Model No. 4100C Breakaway Support System for Call Box Poles



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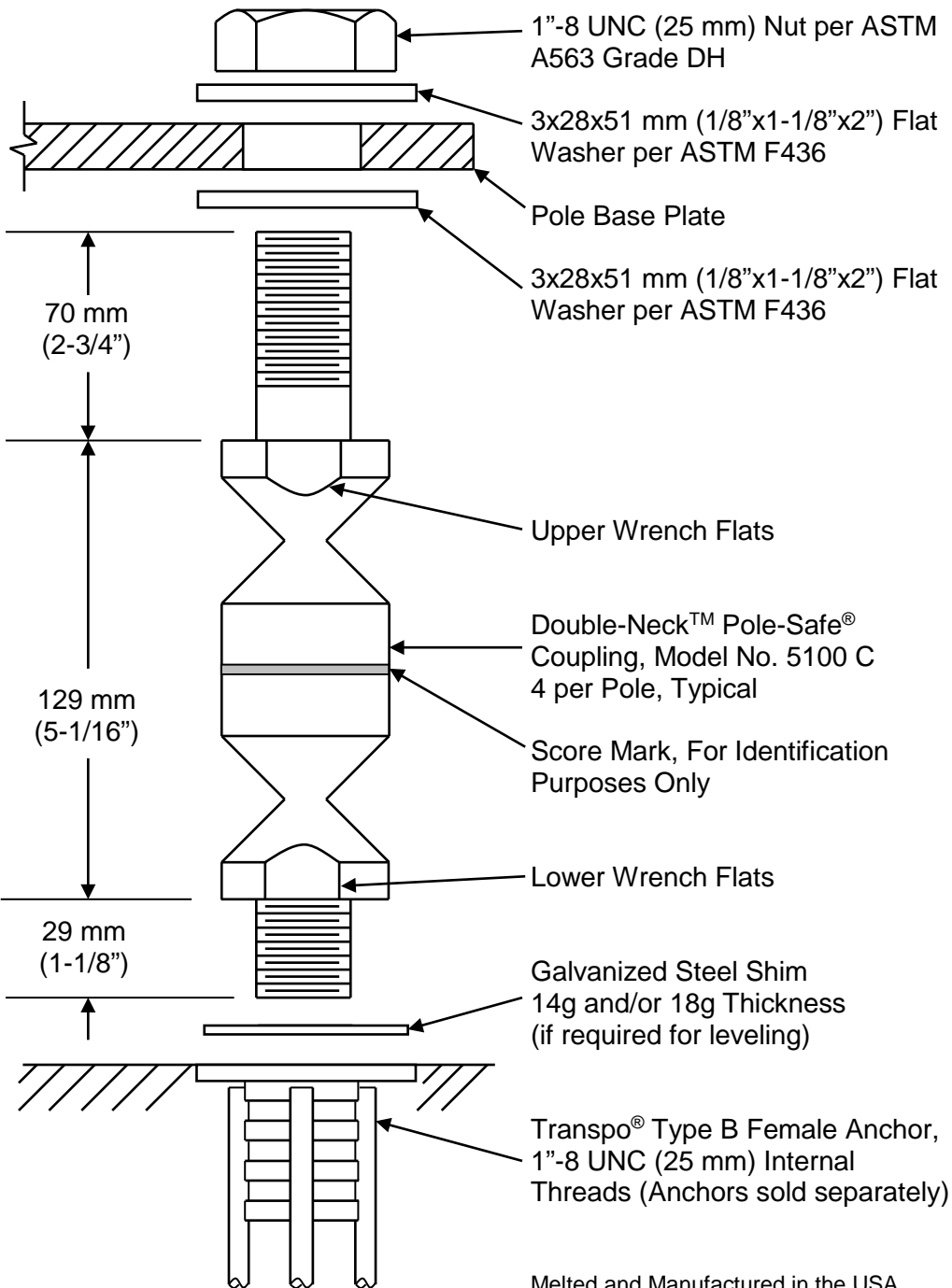
Pole-Safe® Model No. 4100C Breakaway Support System for Call Box Poles

INSTALLATION INSTRUCTIONS

NOTE: Proper Installation is essential for the Pole-Safe Breakaway Support System to function correctly as designed.

1. Surface of foundation around anchor bolts must be smooth, flat and free of debris.
2. Existing anchor bolts MUST be sized to the proper projection height as shown on the reverse side of these instructions. Then, anchor bolts shall be cleaned, and if necessary, coated with cold galvanizing material prior to installing Pole-Safe couplings.
3. Install lower flat washers, and thread Pole-Safe couplings on to anchor bolts.
4. If needed, shims are provided for leveling of the pole base plate, and may be installed at the base of the coupling(s). No more than 2 shims shall be installed on any one coupling. For larger adjustments that may be required, install no more than one additional flat washer under the base plate, on the top shank of the coupling(s).
5. Use lower wrench flats to tighten Pole-Safe couplings on to the anchor bolts. Secure couplings as tight as possible using conventional wrenches. Do not use a pipe wrench. Couplings must be seated squarely on the washers, and washers must be seated uniformly on top of the foundation. If necessary, remove coupling and reduce the anchor bolt projection height to allow proper seating of the couplings.
6. Install a flat washer on top of each Pole-Safe coupling, and set the pole with base plate on top of the couplings.
7. Install a flat washer and nut on to each Pole-Safe coupling extended through the pole base plate. If pole is not plumb, install shims and/or washers for proper leveling as described in Step 4 above.
8. Tighten each nut on to pole base plate. Pole-Safe couplings must be held with an additional wrench on the upper wrench flats to prevent an induced torque stress across the necked portion of the couplings. Nuts shall be tightened using the turn-of-nut method in accordance with American Institute of Steel Construction (AISC) procedures (for ASTM A325 and A490 anchor bolts, 1/3 rotation past "snug tight").

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Patent Nos. 5,474,408 & 6,056,471 1/14

SPECIFICATIONS

Performance Criteria:

1. Double-Neck™ Pole-Safe® conforms to AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals."
2. Double-Neck™ Pole-Safe® has been crash-tested and FHWA approved in accordance with the requirements of NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Physical Properties per Coupling:

1. Ultimate Tensile Strength = 158.7 kN (35.7 kips), minimum.
2. Tensile Yield Strength = 137.5 kN (30.9 kips), minimum.
3. Ultimate Restrained Shear Strength = 12.0 kN (2.7 kips), minimum.
4. Ultimate Restrained Shear Strength = 17.8 (4.0 kips), maximum.

Corrosion Protection:

1. All Double-Neck™ Pole-Safe® couplings, nuts, bolts, and washers are galvanized after fabrication in accordance with ASTM A153. All leveling shims are galvanized after fabrication in accordance with ASTM A653.

Pole-Safe® Model No. 5100C
Breakaway Support System for Call Box Poles



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Pole-Safe® Model No. 5100C
Breakaway Support System for Call Box Poles

INSTALLATION INSTRUCTIONS

NOTE: Proper Installation is essential for the Pole-Safe Breakaway Support System to function correctly as designed.

Anchor Assembly:

1. Fasten Transpo® Type B Female Anchors to a rigid template pre-fabricated to match the specified bolt circle.
2. Lower entire anchor assembly into the fresh concrete foundation, and vibrate assembly into place, such that the anchors are in the proper location to match the holes in the pole base plate. Ensure that all anchors are level and that the tops of the individual anchors and the bottom of the template are flush with the finished top surface of the foundation.
3. Allow foundation to fully cure, and remove template from the anchors.

Coupling Assembly:

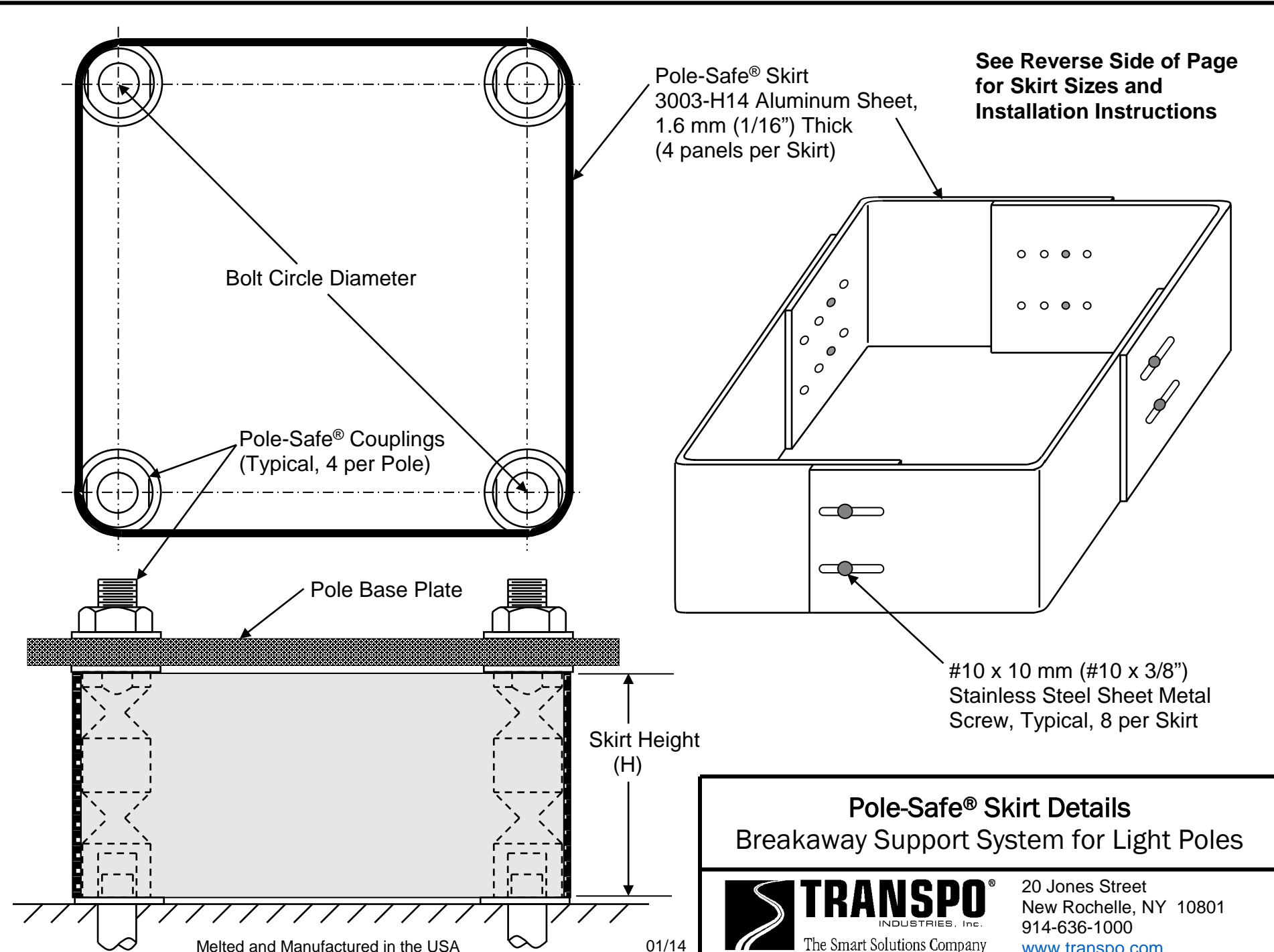
1. Surface of foundation around anchors must be smooth, flat and free of debris.
2. Thread Pole-Safe couplings into Transpo® Type B Female Anchors.
3. If needed, shims are provided for leveling of the pole base plate, and may be installed at the base of the coupling(s). No more than 2 shims shall be installed on any one coupling. For larger adjustments that may be required, install no more than one additional flat washer under the base plate, on the top shank of the coupling(s).
4. Use lower wrench flats to tighten Pole-Safe couplings into the anchors. Secure couplings as tight as possible using conventional wrenches. Do not use a pipe wrench. Couplings must be seated squarely on top of the anchors.
5. Install a flat washer on top of each Pole-Safe coupling, and set the pole with base plate on top of the couplings.
6. Install a flat washer and nut on to each coupling extended through the pole base plate. If pole is not plumb, install shims and/or washers for proper leveling as described in Step 3 above.
7. Tighten each nut on to pole base plate. Pole-Safe couplings must be held with an additional wrench on the upper wrench flats to prevent an induced torque stress across the necked portion of the couplings. Nuts shall be tightened using the turn-of-nut method in accordance with American Institute of Steel Construction (AISC) procedures (1/3 rotation past “snug tight”).

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Pole-Safe Skirt Details





See Reverse Side of Page for Skirt Sizes and Installation Instructions

Pole-Safe® Skirt
3003-H14 Aluminum Sheet,
1.6 mm (1/16") Thick
(4 panels per Skirt)

Bolt Circle Diameter

Pole-Safe® Couplings
(Typical, 4 per Pole)

Pole Base Plate

Skirt Height
(H)

#10 x 10 mm (#10 x 3/8")
Stainless Steel Sheet Metal
Screw, Typical, 8 per Skirt

Pole-Safe® Skirt Details
Breakaway Support System for Light Poles



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Pole-Safe®
Breakaway Support System for Light Poles

SKIRT INFORMATION

Selection Table:

Pole-Safe® Model No.	Bolt Circle Diameter		Skirt Height (H) mm (in.)
	254 mm to 380 mm (10" to 15")	380 mm to 500 mm (15" to 20")	
	Skirt Part No.	Skirt Part No.	
4062	SPMKDN-4	SPMKDN-4L	146 (5-3/4)
4075	SPMKDN-4	SPMKDN-4L	146 (5-3/4)
4100	SPMKDN-5	SPMKDN-5L	168 (6-5/8)
4125	SPMKDN-5	SPMKDN-5L	168 (6-5/8)
5062	SPMKDN-1	SPMKDN-1L	108 (4-1/4)
5075	SPMKDN-1	SPMKDN-1L	108 (4-1/4)
5100	SPMKDN-2	SPMKDN-2L	127 (5)
5125	SPMKDN-3	SPMKDN-3L	133 (5-1/4)

Installation Instructions:

1. Place 4 skirt panels around Pole-Safe Couplings using overlap configuration shown on reverse side of page. All 4 sides of the skirt box should have 2 slots facing outside.
2. Thread 8 sheet metal screws through the outside slots into the closest corresponding holes in the adjacent inside panel.
3. Position panels snug against the Pole-Safe Couplings.
4. Tighten all 8 sheet metal screws.

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U.S. Department
of Transportation
**Federal Highway
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

JAN 16 1997

Refer to: HNG-14

Mr. Arthur M. Dinitz
Transpo Industries, Inc.
20 Jones Street
New Rochelle, New York 10801-6024

Dear Mr. Dinitz:

This is in response to your December 12, 1996, letter to Mr. Gerald L. Eller requesting Federal Highway Administration's (FHWA) acceptance of your double neck Pole-Safe breakaway support couplings for light poles, call boxes, and small sign posts. Transmitted with your letter were a report and video of full-scale testing conducted by E-Tech Testing Services, static test reports from PSI\Pittsburgh Physical Testing, and drawings of the couplings.

Requirements for breakaway supports are those in the American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. We also recognize the testing and evaluation guidelines found in the National Cooperative Highway Research Report Number 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features.

Drawings of the Series 4000 and 5000 Pole-Safe couplings are enclosed. The various coupling series and sizes are manufactured of proprietary "E.T.D. 150" steel. Dimensions and physical properties of the couplings are summarized in the following table:

Model	4062	4100*	4125	5062	5100*	5125
Coupling:						
Length	188.9 mm	227.0 mm	257.0 mm	184.1 mm	227.0 mm	254.0 mm
Neck Diam.	11.18 mm	16.51 mm	16.51 mm	11.17 mm	16.51 mm	16.51 mm
U.T.S. **	133.5 kN	267 kN	267 kN	133.5 kN	267 kN	267 kN
Yield Strength	89 kN	191 kN	191 kN	89 kN	191 kN	191 kN

Model	4062	4100*	4125	5062	5100*	5125
Anchor Bolt:						
Threads	External	External	External	Internal	Internal	Internal
Diameter	16 mm	25 mm	32 mm	16 mm	25 mm	32 mm
Diam. (English)	5/8 "	1 "	1 1/4 "	5/8 "	1 "	1 1/4 "

*Couplings used in tests. Because the neck diameter of the largest of the three couplings in both the 4000 and 5000 series is the same as that of the tested coupling, similar performance can be expected.

** Ultimate Tensile Strength of the coupling.

A summary of the crash testing is presented in the following table:

Test Number	03-8287-001	03-8287-002
Test Article - Model Number	4100	5100
Pole Mass	423 kg (1000 #)	423 kg (1000 #)
Pole Height	16.8 m (55 ft)	16.8 m (55 ft)
Vehicle Mass	829 kg (1828 #)	839 kg (1850 #)
Impact Speed	34.35 km/h (21.3 m/h)	101.56 km/h (63.11 m/h)
Occupant Impact Speed	4.35 m/s (14.37 ft/s)	3.27 m/s (10.73 ft/s)
Approximate Stub Height	54 mm (2 1/8 in)	25.4 mm (1 in) *

*Three couplings broke at the lower notch. The fourth broke at the upper wrench flat and was left nearly intact attached to the foundation. It was judged that the remaining coupling would not present a significant hazard.

The results of the tests meet the change-in-velocity and stub height criteria adopted by the FHWA. Therefore, Pole Safe Couplings Series 4000 and 5000, as noted in the table above, are acceptable for use on the National Highway System (NHS) within the range of conditions tested when requested by a State.

Our acceptance is limited to the breakaway characteristics of the couplings and does not cover their durability or structural performance. Presumably, you will supply potential users with sufficient information on design and installation requirements to ensure proper performance. We anticipate that the States will require certification from Transpo Industries that the hardware

furnished has essentially the same mechanical properties and geometry as those used in the crash testing, and that they will meet the FHWA change in velocity requirements.

The loading eccentricity in the reported fatigue test was not very significant in comparison to an eccentricity in excess of half the bearing diameter of the hold-down nut that will result from an out-of-plumb anchor bolt. However, because our review does not include the structural adequacy of your new couplings, the fatigue testing is not relevant to our review. Our reason for commenting on the eccentricity is to ensure that we will not be interpreted as having accepted the distance used. In addition we have offered no opinion on the relevance of the loading range used in the fatigue testing from minus 6.3 percent to 17.4 percent of the reported minimum yield strength of the couplings. We would also point out that the fatigue test report supplied did not contain adequate descriptions of the items tested.

The Pole-Safe couplings are a proprietary product. To be used in Federal-aid projects, except exempt, non-NHS projects: they (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities or that no equally suitable alternative exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

Sincerely yours,



Dwight A. Horne, Chief
Federal-Aid and Design Division

2 Enclosures



U.S. Department
of Transportation
**Federal Highway
Administration**

December 14, 2000

400 Seventh St., S.W.
Washington, D.C. 20590

Refer to: HSA-1 / LS-45C

Eric C. Lohrey, P.E.
Chief Engineer
Transpo Industries, Inc.
20 Jones Street
New Rochelle, NY 10801

Dear Mr. Lohrey:

Thank you for your letter of November 1 requesting Federal Highway Administration (FHWA) acceptance for two additional production models of your "Double Neck" Pole-Safe breakaway couplings. You requested that we find Models 4075 and 5075 acceptable for use on the National Highway System (NHS) under the provisions of National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Introduction

We found six models of the Double Neck couplings acceptable for use in our Acceptance Letter LS-45B dated January 16, 1997. Testing of the supports was in compliance with the guidelines contained in the NCHRP Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features. Requirements for breakaway supports are those in the American Association of State Highway and Transportation Officials' Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

Your current request is to add two additional production models, the details of which are in the table below:

Model	4075	5075
Anchor Thread Type	External	Internal
Anchor Diameter	19 mm (3/4 inch)	19 mm (3/4 inch)
Coupling Length	208 mm (8 - 3/16 inch)	196 mm (7 - 3/4 inch)
Neck Diameter	12.7 mm (1/2 inch)	12.7 mm (1/2 inch)
Ultimate Tensile Strength	131.0 kN (29,400 pounds)	131.0 kN (29,400 pounds)
Tensile Yield Strength	113.6 kN (25,500 pounds)	113.6 kN (25,500 pounds)

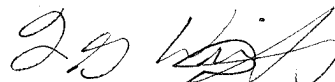
Findings

The couplings used in the tests (and reported in LS-45B) had a neck diameter of 16.51 mm. The two models for which you are requesting acceptance have significantly smaller neck diameters. Since all Double Neck couplings are fabricated from E.T.D. 150 Steel (a proprietary grade of steel with a tensile strength of 1034 mPa [150 ksi]), Models 4075 and 5075 will break at a lower energy level, causing less of a velocity change than the couplings used in the successful tests. Therefore, the devices described above and shown in the enclosed drawings for reference are acceptable for use as Test Level 3 devices on the NHS under the range of conditions that the earlier couplings were tested, when proposed by a State.

Please note the following standard provisions which apply to FHWA letters of acceptance:

- Our acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the device being marketed is significantly different from the version that was crash tested, it reserves the right to modify or revoke its acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that they will meet the crashworthiness requirements of FHWA and NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number LS-45C shall not be reproduced except in full. As this letter and the supporting documentation which support it become public information, it will be available for inspection at our office by interested parties.
- The "Pole-Safe Double Neck" couplings are patented products and considered "proprietary." The use of proprietary devices specified on Federal-aid projects, except exempt, non-NHS projects (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities or that no equally suitable alternative exists or; (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, copies of which have been enclosed with previous correspondence.

Sincerely yours,



Frederick G. Wright, Jr.
Program Manager, Safety