



Tapex Industrial Pty Ltd

PRODUCT APPRAISAL REPORT 1609 Issue 2

Copperhead Reinforced Tracer Wire System

WSA PS-343 Tracer Wire

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Overview of WSAA

The Water Services Association of Australia (WSAA) is the peak industry body representing the urban water industry. Our members provide water and sewerage services to over 20 million customers in Australia and New Zealand and many of Australia's largest industrial and commercial enterprises.

Based around our vision of 'customer driven, enriching life', WSAA facilitates collaboration, knowledge sharing, networking and cooperation within the urban water industry. We are proud of the collegiate attitude of our members which has led to industry-wide approaches to national water issues.

WSAA can demonstrate success in the standardisation of industry performance monitoring and benchmarking, as well as many research outcomes of national significance. The WSAA Executive retains strong links with policy makers and legislative bodies and their influencers, to monitor emerging issues of importance to the urban water industry.

WSAA was formed in 1995 as a non-profit organisation to foster the exchange of information between industry, government and the community, and to promote sustainable water resource management.

The urban water industry is committed to anchoring its services to customers' values, and to enrich communities where water services have broad economic, environmental and social values. In line with this our main activities focus on four areas:

1. influencing national and state policies on the provision of urban water services and sustainable water resource management
2. promoting debate on environmentally sustainable development and management of water resources and the community health requirements of public water supplies
3. improving industry performance and establishing benchmarks and industry leading practices for water service processes; and
4. fostering the exchange of information on education, training, research, water and wastewater management and treatment and other matters of common interest.

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CONTENTS

1 EXECUTIVE SUMMARY	5
1.2 Recommendations	5
2 THE APPLICANT	5
2.1 The Supplier	5
2.2 The Manufacturer	5
3 THE PRODUCT	6
3.2 Copperhead Reinforced Tracer Wire	6
3.3 Connectors	7
3.3.1 Snakebite connectors	7
3.3.2 Mainline to service connectors	7
3.3.3 Twist-on connectors	7
3.3.4 Pipe burst connectors	8
3.4 SnakePit access points	8
3.5 Grounding rods	9
4 SCOPE OF THE APPRAISAL	9
5 APPRAISAL CRITERIA	9
5.1 Quality Assurance Requirements	9
5.2 Performance Requirements	9
6 COMPLIANCE WITH APPRAISAL CRITERIA	10
6.1 Compliance with Quality Assurance Requirements	10
6.2 Compliance with Performance Requirements	10
6.2.1 Materials	10
6.2.2 Detectability tests	11
6.2.3 Fatigue Tests	11
6.2.4 Elongation	11
6.2.5 Colour	11
7 FITTING INSTRUCTIONS, TRAINING AND INSTALLATION	11
8 PRODUCT MARKING	11
9 PACKAGING AND TRANSPORTATION	11
10 PRODUCT WARRANTY	12
11 WATER AGENCY EXPERIENCE WITH THE PRODUCT OR FIELD TESTING REPORT	12
12 OUTCOMES OF EXPERT PANEL PRODUCT REVIEW	12
13 FUTURE WORKS	12
14 DISCLAIMER	12
14.1 Issue of Report	12
14.2 Limits on Reliance on Information and Recommendations	13
14.2.1 Disclaimer of liability	13
14.2.2 Intellectual Property and other rights	13
14.2.3 Need for independent assessment	13
14.3 No Updating	14
14.4 No Warranty	14
APPENDIX A – PRODUCT LITERATURE	15
APPENDIX B - QUALITY CERTIFICATIONS	24
APPENDIX C - SUPPLIER CONTACTS	26

1 EXECUTIVE SUMMARY

Tapex Industrial Pty Ltd, a member of the Tapex Group, provides a range of underground asset protection products including locating systems, warning tapes, protection plates, cable covers, marker products and twines to the water, mining, gas and telecommunications industries.

Copperhead Industries LLC, based in Minnesota USA, is the supplier of the Copperhead® Reinforced Tracer Wire System. The tracer wire is manufactured by Copperweld Bimetallics LLC based in Tennessee USA.

This Appraisal is for the Copperhead Reinforced Tracer Wire System used for locating underground non-metallic pipelines.

This Issue 2 is a replacement for the previous version of the appraisal which had reached its 5-year expiry date.

The system components include:

- (a) copperhead reinforced tracer wire consisting of a high carbon steel wire with a conductive copper cladding and insulated with a high-density polyethylene jacket,
- (b) connectors to join the wire,
- (c) SnakePit termination and grounding access points to provide access for direct connection of a transmitter to the tracer wire and
- (d) magnesium grounding rods for installation on tracer wire dead ends to complete the electrical circuit.

The Copperhead system is available with a range of tensile strengths that are designed to suit open cut, horizontal directional drilling and pipe bursting installations.

Copperweld Bimetallics LLC holds an ISO 9001:2015 Quality Management System Licence.

This Appraisal has determined that the Copperhead Reinforced Tracer Wire System, as detailed in this report, meets the requirements of WSA PS-343 *Tracer Wire, Detectable* and is considered as 'fit-for-purpose'.

1.2 Recommendations

It is recommended that WSAA members, subject to any specific requirements of the member, accept or authorise the Copperhead Reinforced Tracer Wire System, as detailed in this report, for use in open cut, horizontal directional drilling and pipe bursting applications provided it is designed and installed in accordance with the relevant WSAA Codes and manufacturer's requirements.

2 THE APPLICANT

The Applicant is Tapex Industrial Pty Ltd.

2.1 The Supplier

Tapex Industrial Pty Ltd, a member of the Tapex Group, provides a range of underground asset protection products including locating systems, warning tapes, protection plates, cable covers, marker products and twines to the water, mining, gas and telecommunications industries.

2.2 The Manufacturer

Copperhead Industries LLC is a Minnesota based company in the USA that specialises in developing products and solutions for the maintenance and installation of underground utility infrastructure.

Copperhead is the leading supplier of copper clad steel tracer and related products in the USA and other countries, including Canada, France, Columbia, Costa Rica, New Zealand and Australia either directly or indirectly through supply agents.

The Copperhead reinforced copper clad steel wire is manufactured by Copperweld Bimetallics LLC in Tennessee USA. Copperweld is the largest manufacturer of copper clad steel wire in the world and has been manufacturing the wire since 1915.

Other system components are sourced from USA based manufacturers under supply agreements with Copperhead Industries LLC.

3 THE PRODUCT

This Appraisal is for the Copperhead Reinforced Tracer Wire System for facilitating accurate location of underground non-metallic pipelines without the need for excavation.

The system components include:

- (a) copperhead reinforced tracer wire consisting of a high carbon steel wire with a conductive copper cladding and insulated with a high-density polyethylene jacket,
- (b) connectors to join the wire,
- (c) SnakePit termination and grounding access points to provide access for direct connection of a transmitter to the tracer wire and
- (d) magnesium grounding rods for installation on tracer wire dead ends to complete the electrical circuit.

3.2 Copperhead Reinforced Tracer Wire

The copper outer cladding is metallurgically bonded by heat and pressure to the steel core, making them inseparable. The cladding process ensures that the wire is free of gaps in the metals, resulting in a consistent signal and strength over the entire length of the wire. The tracer wire is insulated with a protective high density polyethylene jacket. See Figure 1.

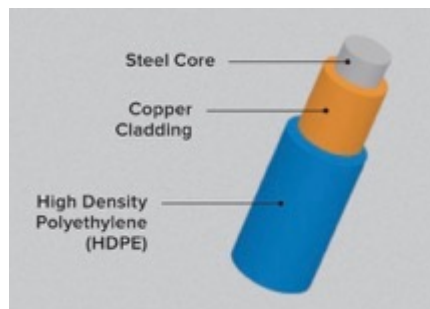


FIGURE 1 COPPERHEAD COPPER CLAD STEEL (CCS) TRACER WIRE

The high carbon steel designation is AISI Grade 1055 and the copper designation is UNS-C10200 to ASTM B170.

The Copperhead tracer wire product range has been specifically designed for different installation applications:

- SuperFlex for light duty open cut
- High Strength for heavy duty open cut
- SoloShot Extra High Strength for horizontal directional drilling
- SoloShot Xtreme for pipe bursting

Each tracer wire is available with a range of different gauges and break loads, enabling the installer to select the most appropriate tracer wire for the particular installation method. See Appendix A for details of the full range.

Some of the benefits of the Copperhead system compared to solid copper wire include:

- (a) more durable

- (b) longer lasting
- (c) stronger, up to 6 times the break load
- (d) lighter weight resulting in lower transport costs
- (e) reduced risk of theft due to lack of after market value
- (f) direct connection points make it easier to connect to the tracer wire
- (g) can be accurately detected for greater than 2 km between test stations
- (h) can be detected at depths up to 4.5m

In addition, conductivity of copper-clad steel wire is significantly higher than for stainless steel wire, resulting in better performance and detection.

3.3 Connectors

All Copperhead connectors are waterproof and corrosion proof.

3.3.1 Snakebite connectors

Snakebite connectors utilise an exclusive 90-degree twist lock design eliminating the need to cut the main line to make connections. Up to 3 wires can be connected and no wire stripping is necessary. See Figure 2.



FIGURE 2 SNAKEBITE CONNECTORS

3.3.2 Mainline to service connectors

These connectors allow connection of a service lateral tracer wire to the mainline tracer wire without the need to cut the mainline wire. The outer lid locks down in three places. See Figure 3.



FIGURE 3 MAINLINE TO SERVICE CONNECTORS

3.3.3 Twist-on connectors

The regular size connects up to four wires and the large size connects up to six wires. See Figure 4.



FIGURE 4 TWIST ON CONNECTORS

3.3.4 Pipe burst connectors

This connector is for use with SoloShot Xtreme tracer wire for pipe bursting installations. The connector handles a variety of wire size combinations



FIGURE 5 PIPE BURST CONNECTORS

3.4 SnakePit access points

SnakePit access points are used to protect and provide direct connection to the tracer wire system and also allow external connection and disconnection to the grounding rod.

The SnakePit access points consist of a cast iron lid attached to an ABS plastic riser tube and incorporate corrosion resistant brass terminals.

The lockable lids are coated with a corrosion resistant lacquer-based or enamel paint, colour-coded for identification and include an encapsulated magnet system for easy location of buried lids. The lids can be locked by a 5-sided wrench.

The test stations also come in a range of light to heavy duty with models designed to be installed in disturbed ground or in roads and pavements. See Figure 6.



FIGURE 6 SNAKEPIT ACCESS POINTS

An above ground alternative to the SnakePit is the Cobra test station. The Cobra access point is a colour coded polypropylene panel that can be mounted to a wall, post or other fixed object. It has provision for three stainless steel terminals. The polypropylene material is rugged and resistant to many chemical solvents, bases and acids. See Figure 7.



FIGURE 7 COBRA TEST STATION

3.5 Grounding rods

Grounding tracer wire dead ends is essential for completing the electrical circuit needed for line detection. The drive-in magnesium grounding rods pull the electrical current emitted by the transmitter down the tracer wire for detection. The rod is supplied with 60m of copper clad steel wire with a PE jacket. Refer to Figure 8.



FIGURE 8 GROUNDING RODS

4 SCOPE OF THE APPRAISAL

This appraisal is for the Copperhead reinforced tracer wire system which includes the Copperhead tracer wire, Connectors, SnakePit access points and grounding rods as described in Section 3 of this report.

5 APPRAISAL CRITERIA

5.1 Quality Assurance Requirements

The WSAA Product Appraisal Technical Advisory Group accepts Tracer Wire manufactured under cover of a third-party certified management system complying with AS/NZS ISO 9001 and having ISO Type 1 product certification to the relevant ASTM standards by a JAS-ANZ accredited Conformity Assessment Body (CAB) or by a CAB accredited by an international accreditation system recognised by JAS-ANZ.

For Type 1 certification, an independent body or CAB verifies that a satisfactory type test of a sample of the product has been completed. Tests for verifying critical performance attributes should be stipulated in the product specification. Certification expires when there is a design change (including materials and/or manufacturing method). Type 1 product certification is the simplest and most limited form of independent certification of product conformance.

There is no follow-up testing or auditing by the CAB. Manufacturing quality control is generally not typically required for Type 1 product certification, unless the product is used in situations where failure would result in moderate consequences of failure or where the likelihood of failure is moderate.

In this instance the WSAA Product Appraisal Technical Advisory Group has determined Type 1 product certification, in conjunction with an ISO 9001 quality management system, is a satisfactory requirement for this product.

5.2 Performance Requirements

There are no Australian Standards for detectable tracer wire. The material used in the Copperhead reinforced tracer wire has been designed and manufactured in accordance with a range of appropriate ASTM standards, ensuring a consistent, quality product that is fit-for-purpose.

A WSAA Product Specification has been developed in collaboration with the Applicant and the WSAA Product Appraisal Technical Advisory Group.

The Copperhead Reinforced Tracer Wire has been appraised for compliance with WSA PS-342 *Tracer Wire, Detectable* including the following ASTM standards:

- ASTM B910 / B910M - 07(2013) *Standard Specification for Annealed Copper-Clad Steel Wire.*
- ASTM B170-99(2015) *Standard Specification for Oxygen-Free Electrolytic Copper—Refinery Shapes.*
- ASTM D1248 - 12 *Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.*
- ASTM-B 843 - 13 *Standard Specification for Magnesium Alloy Anodes for Cathodic Protection.*

Additional Performance requirements include:

- Proof of detectability of the CCS tracer wire as determined by field testing
- Fatigue testing to ASTM B 470 *Standard Specification for Bonded Copper Conductors for Use in Hookup Wires for Electronic Equipment*
- CCS tracer wire colour requirements.

Appraisal criteria are also determined by the WSAA Product Appraisal Technical Advisory Group and regularly reviewed to ensure that the criteria reflect the requirements of WSAA members.

The following Product Specification is relevant to this application:

WSA PS-342 *Tracer Wire, Detectable*

A copy of the Product Specification is available at the following link:

<https://www.wsaa.asn.au/shop/product/53481>

6 COMPLIANCE WITH APPRAISAL CRITERIA

6.1 Compliance with Quality Assurance Requirements

Tapex has submitted the following quality certificate:

- ISO 9001:2015 Certificate of Registration No. 94-201j issued to Copperweld Bimetallics LLC by Intertek

A copy of the Quality Assurance licence has been included in Appendix B and is also available from WSAA.

6.2 Compliance with Performance Requirements

6.2.1 Materials

The CCS tracer wire consists of an annealed high carbon AISI Grade 1055 steel wire with a conductive copper cladding with designation of UNS-C10200 to ASTM B-170.

The high-density polyethylene insulating jacket complies with ASTM D1248-12. The physical, mechanical, and electrical properties are included in Appendix A.

The SnakePit access point cast iron covers and surrounds comply with ASTM A126 Class B. Corrosion resistant brass terminals are located below the cover. The cover and surround fits into a 400 mm diameter ABS riser tube.

The Cobra test station consists of a colour coded polypropylene panel that can be mounted to a wall, post or other fixed object.

The extruded magnesium rods are manufactured to ASTM B-843-13 *Standard Specification for Magnesium Alloy Anodes for Cathodic Protection* Type AZ31B.

6.2.2 Detectability tests

Tracer wire detectability was determined by signal carrying tests performed by Copperhead and Kansas Gas Service.

Signal carrying tests carried out independently by Copperhead and Kansas Gas Service show the CCS tracer wire, when used in conjunction with SnakeBite Connectors and SnakePit Test Stations, recorded no significant signal loss over 520 m. Copies of reports are available from WSAA.

Detectability of Copperhead tracer wire is dependent on the Copperhead Reinforced Tracer Wire being used in conjunction with the recommended test stations and connectors. Knowledge of detection equipment operation/limitations and the operation of equipment by experienced operators will further improve the chances of detection.

6.2.3 Fatigue Tests

Copperhead reinforced copper clad steel (CCS) tracer wire has been fatigue tested in accordance with ASTM B470-02 *Standard Specification for Bonded Copper Conductors for Use in Hookup Wires for Electronic Equipment*. A copy of the report is available from WSAA.

6.2.4 Elongation

The HS and SuperFlex wire can achieve > 15% elongation before breakage, which is considered sufficient to allow for all but the most extreme ground movements. The SoloShot EHS and Extreme wires may only achieve 1% elongation before breakage.

Tracer wire elongation capacity was tested according to BS 2782-3: *Method 326E:1995 Plastics - Determination of tensile properties - Test conditions for films and sheets*.

6.2.5 Colour

The HDPE insulated jacket on the Copperhead tracer wire is available in yellow, orange, red, purple, blue, green, white and black.

Australian Water Agencies default colours are blue for drinking water, purple for drinking water and cream for sewerage.

The copperhead tracer wires are not available in cream, however black is considered to be a reasonable substitute for sewerage as black is widely used for PE sewer pipes.

7 FITTING INSTRUCTIONS, TRAINING AND INSTALLATION

Copperhead tracer wire is designed to provide superior detection and is not a warning tape. As such the installation of tape referenced in WSA 02-2014 and WSA 03-2011 is not applicable for this product. Copperhead tracer wire is installed snugly beneath the asset in the case of open cut installations and pulled through with the pipe in the case of HDD and pipe bursting installations.

Installation instructions for grounding rods are included in Appendix A.

Installation instructions for SnakePit access points are included in Appendix A.

8 PRODUCT MARKING

There are no markings on the tape.

9 PACKAGING AND TRANSPORTATION

The Copperhead tracer wire is provided in spools with lengths of approximately 150, 300 or 760 m.

10 PRODUCT WARRANTY

The products are covered by the normal commercial and legal requirements of the *Competition and Consumer Act 2010 (Cth)*, which covers manufacture to the relevant standard, and details of Tapex's warranty is included in their terms and conditions of sale.

11 WATER AGENCY EXPERIENCE WITH THE PRODUCT OR FIELD TESTING REPORT

The Copperhead Reinforced Tracer Wire System has been used extensively in open cut, horizontal directional drilling and pipe bursting applications for all major water agencies within Australia for the last 5 years.

12 OUTCOMES OF EXPERT PANEL PRODUCT REVIEW

A series of Frequently Asked Questions are available at the following link:

<http://copperheadwire.com/resources/faqs/>

13 FUTURE WORKS

No future works have been identified.

14 DISCLAIMER

This Product Appraisal Report (Report) is issued by the Water Services Association of Australia Limited on the understanding that:

This Report applies to the product(s) as submitted. Any changes to the product(s) either minor or major shall void this Report.

To maintain the recommendations of this Report any such changes shall be detailed and notified to the Product Appraisal Manager for consideration and review of the Report and appropriate action. Appraisals and their recommendations will be the subject of continuous review dependent upon the satisfactory performance of products.

WSAA reserves the right to undertake random audits of product manufacture and installation. Where products fail to maintain appraised performance requirements the appraisal and its recommendations may be modified and reissued. Appraisal reports will be reviewed and reissued at regular intervals not exceeding five (5) years.

The following information explains a number of very important limits on your ability to rely on the information in this Report. Please read it carefully and take it into account when considering the contents of this Report.

Any enquiries regarding this report should be directed to the Program Manager, Carl Radford, Phone: 03 8605 7601 email carl.radford@wsaa.asn.au.

14.1 Issue of Report

This Report has been published and/or prepared by the Water Services Association of Australia Limited and nominated Project Manager and peer group of technical specialists (the Publishers).

The Report has been prepared for use within Australia only by technical specialists that have expertise in the function of products such as those appraised in the Report (the Recipients).

By accepting this Report, the Recipient acknowledges and represents to the Publisher(s) and each person involved in the preparation of the Report that the Recipient has understood and accepted the terms of this Disclaimer.

14.2 Limits on Reliance on Information and Recommendations

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This Report does not contain all information that a person might require for the purposes of assessing any product discussed or appraised within it (Product). The product appraisal criteria used in preparing this Report may not address all relevant aspects of the Product.

Recipients should seek independent evidence of any matter which is material to their decisions in connection with an assessment of the Product and consult their own advisers for any technical information required. Any decision to use the Product should take into account the reliability of that independent evidence obtained by the Recipient regarding the Product.

Recipients should also independently verify and assess the appropriateness of any recommendation in the Report, especially given that any recommendation will not take into account a Recipient's particular needs or circumstances.

WSAA has not evaluated the extent of the product liability and professional indemnity insurance that the provider of the product maintains. Recipients should ensure that they evaluate the allocation of liability for product defects and any professional advice obtained in relation to the product or its specification including the requirements for product liability and professional indemnity insurance.

14.3 No Updating

Neither the Publisher(s) nor any person involved in the preparation of this Report [has] [have] any obligation to notify you of any change in the information contained in this Report or of any new information concerning the Publisher(s) or the Product or any other matter.

14.4 No Warranty

The Publisher(s) do[es] not, in any way, warrant that steps have been taken to verify or audit the accuracy or completeness of the information in this Report, or the accuracy, completeness or reasonableness of any recommendation in this Report.

APPENDIX A – PRODUCT LITERATURE

COPPERHEAD INDUSTRIES

Complete Utility Locating System™

Protecting Underground Utility Assets

Potable
WATER

Sanitary & Storm
SEWER

Reclaimed
WATER

COPPERHEADWIRE.COM





THE COMPLETE UTILITY LOCATING SYSTEM™

COPPERHEADWIRE.COM

Copperhead Industries believes that utilities and contractors should have complete confidence in the products they use to protect underground infrastructures.

We understand underground utility construction and the concerns around accurate utility detection long after pipes and cables are buried. We also understand accurate, efficient locating and the importance of establishing strong grounds in order to complete the electrical circuit required for detection. We know that without a reliable tracer wire system, underground utility assets are jeopardized.

THE COMPLETE UTILITY LOCATING SYSTEM™ combines 100+ years of cladding experience, American innovation and ingenuity, knowledge of underground utility construction, and in-depth utility locating

expertise to provide the strongest, most reliable tracer wire system on the market. The system includes Copperhead® copper-clad steel tracer wire designed specifically for open cut, directional drilling, and pipe bursting applications, corrosion-proof locking connectors, drive-in magnesium ground rods, access points, and locating equipment to provide the most reliable end-to-end signal for utility locating.

WHY?

To safeguard what matters most. Protect your investment. Protect your infrastructure. Specify Copperhead's Complete Utility Locating System for your next underground utility construction project.

COPPERHEAD SET THE STANDARD FOR TRACER WIRE SYSTEMS.



1 | ©Copperhead Industries 2019. All Rights Reserved. MADE IN THE USA



KEY STEPS

Pinpoint the exact location of underground utilities with Copperhead's Complete Utility Locating System™

1 CONDUCT

The right tracer wire matters. Choose 100% American-made Copperhead® copper-clad steel wire designed for open cut, directional drill, and pipe bursting, with a protective high density polyethylene (HDPE) jacket.



2 CONNECT

Solid connections are critical to allowing the locate signal to continue throughout the tracer wire system. Make sure connectors are corrosion-proof with non-hardening dielectric silicone sealant.



3 GROUND

Properly grounding the tracer wire system is the difference between being able to locate your utility, or not. Use a Copperhead® drive-in magnesium ground rod at all dead ends to pull the signal to the target.



4 ACCESS

Directly connect to your tracer wire system, protect tracer wire termination points, and turn ground on/off to isolate different sections of the tracer wire system with Copperhead® access points.



5 LOCATE

Locate tracer wire and other buried objects as needed and at the time of rough grade and before final acceptance of the project with multi-function Copperhead® locating equipment.



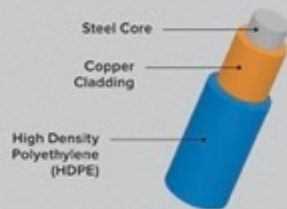
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CONDUCT

WHY COPPERHEAD® COPPER-CLAD STEEL (CCS) TRACER WIRE

Not all CCS is created equal. Pioneered by Copperhead Industries, CCS tracer wire is simply the best choice for accurate and efficient underground utility detection. Strong and highly conductive. Corrosion resistant. And withstands the rigors of underground construction. CCS combines the strength of fully annealed high-carbon steel with the conductivity of copper, all in one high-performance wire.



CCS offers several advantages over solid copper:

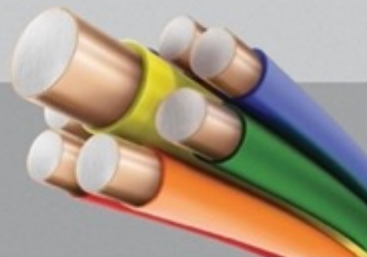
- More durable
- Longer lasting
- Stronger — up to six times the break load
- Reduced material cost
- More stable, longer-term pricing
- Reduced threat of theft due to lack of after-market value
- Lower shipping and handling cost due to lighter weight

CCS is a bimetallic product manufactured by metallurgically bonding two metals with heat and pressure making them inseparable. Only our cladding process ensures that the wire is free of gaps in the metals, resulting in a consistent signal and strength over the entire length of the wire. Copperhead CCS tracer wire is insulated with a protective high-density polyethylene (HDPE) jacket designed for direct bury.

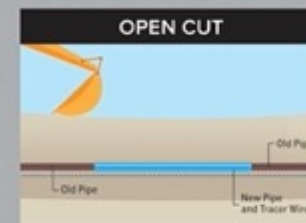
THE RIGHT WIRE FOR THE JOB

Tough jobs require tough wire. But not all jobs need the same tracer wire. That's why Copperhead tracer wire comes in multiple strengths and lengths, and is color coded to meet American Public Works Association (APWA) standards. From open cut, to directional drilling, to pipe bursting — whatever the application, Copperhead has the right wire for your project.

AMERICAN PUBLIC WORKS ASSOCIATION (APWA) UNIFORM COLOR CODE



Copperhead CCS tracer wire is the best at protecting your underground utility assets from future damage.



Open cut trenching is the traditional method for excavation used to expose existing or install new utilities where there are no buildings or other obstructions, then backfilling the trench.

High Strength

- Most specified tracer wire for open cut applications
- 2 times the break load of solid copper
- Heavy-duty applications
- Industry exclusive in strength and reliability

SuperFlex™

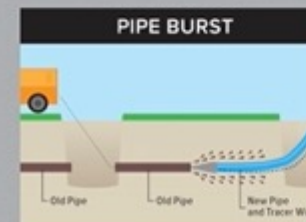
- As flexible as solid copper
- Light-duty applications
- Economical



Directional drilling is a trenchless method of installing underground utilities that involves drilling along a chosen bore path to install utilities that need to go under roads, sidewalks, or other obstructions.

SoloShot™ Extra-High Strength

- Engineered to handle the rigors of directional drilling
- 6 times the break load of solid copper
- Pulls through the first time
- No need to pull multiple wires



Pipe bursting is a trenchless method of replacing old buried pipes with new replacement pipe by bursting the old pipe and putting new pipe in its place.

SoloShot™ Xtreme

- Strongest, most durable tracer wire
- Designed to withstand the volatile environment of pipe bursting and critical bores
- Highest break load
- Toughest protective jacket
- No need to run multiple wires



CONNECT

A tracer wire system is only as good as its weakest connection. Waterproof, corrosion-proof connectors protect vulnerable wire splices and keep the locate signal flowing across connections. All Copperhead connectors are designed for direct bury.



SnakeBite™ Locking Connector

- No wire stripping needed
- Exclusive 90-degree twist-lock design
- Connects up to 3 wires
- Simply insert wires, twist, and lock
- Won't open during backfilling
- Waterproof, corrosion-proof
- Dielectric non-hardening silicon sealant



Mainline-to-Service Connector

- Connects service lateral tracer wire to mainline tracer wire
- No need to cut the mainline tracer wire
- 3-way connection
- Outer lid locks down in 3 places
- Waterproof, corrosion-proof
- Dielectric non-hardening silicon sealant



Twist-on Connectors

- Waterproof, corrosion-proof
- Dielectric non-hardening silicon sealant
- Regular size connects up to 4 wires
- Large size connects up to 6 wires



Pipe Burst Connectors

- Works with SoloShot™ Xtreme tracer wire
- Handles variety of wire size combinations
- Weather resistant

GROUND

Grounding all tracer wire dead ends is essential for completing the electrical circuit needed for line detection.



Ground Rod

- Pulls the electrical current emitted by the locate transmitter down the tracer wire for detection
- 1.5 lb drive-in magnesium ground rod
- HDPE cap provides sturdy drive-in surface
- 20' copper-clad steel wire with 30 mil HDPE jacket

OTHER PRODUCTS



Service Ready Kit

- Contains all components necessary to install the Complete Utility Locating System™ from the mainline to the edge of right-of-way to a building



Valve Cover Lifter

- Lifts dual pick point valve covers
- Single-handed operation
- Lightweight



ACCESS

Access Points are used to protect and provide direct connection to tracer wire systems. The multi-terminal SnakePit and Cobra Access Points also allow external connection and disconnection to ground rod wire.



SnakePit® Access Points

- Ground-level access
- Available with patent-pending Two-terminal Switchable Lid which allows locators to switch ground off and on from top of lid, no need to remove lid
- Encapsulated magnet provides easy detection by ferrous metal detector
- Anti-corrosion gel to protect wires
- Lid color-coded to meet APWA standards for utility detection
- SnakePit Bracket secures SnakePit alongside curb box



Cobra™ Access Points

- Above-ground access
- Multiple mounting options: post, hydrant, stake
- Can be used with rigid or flexible PVC conduit
- Color-coded to meet APWA standards for utility detection



SnakeSkin™ Access Point

- Above-ground access
- No ground connection
- Color-coded to meet APWA standards for utility detection

LOCATE

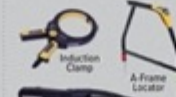
The ViperMag™ is a general-purpose locator designed to locate pipes and cables, as well as Copperhead's Complete Utility Locating System™.

STANDARD EQUIPMENT



INCLUDES: receiver, transmitter, direct connection cables, ground rod, alkaline batteries, soft sided case, user guide

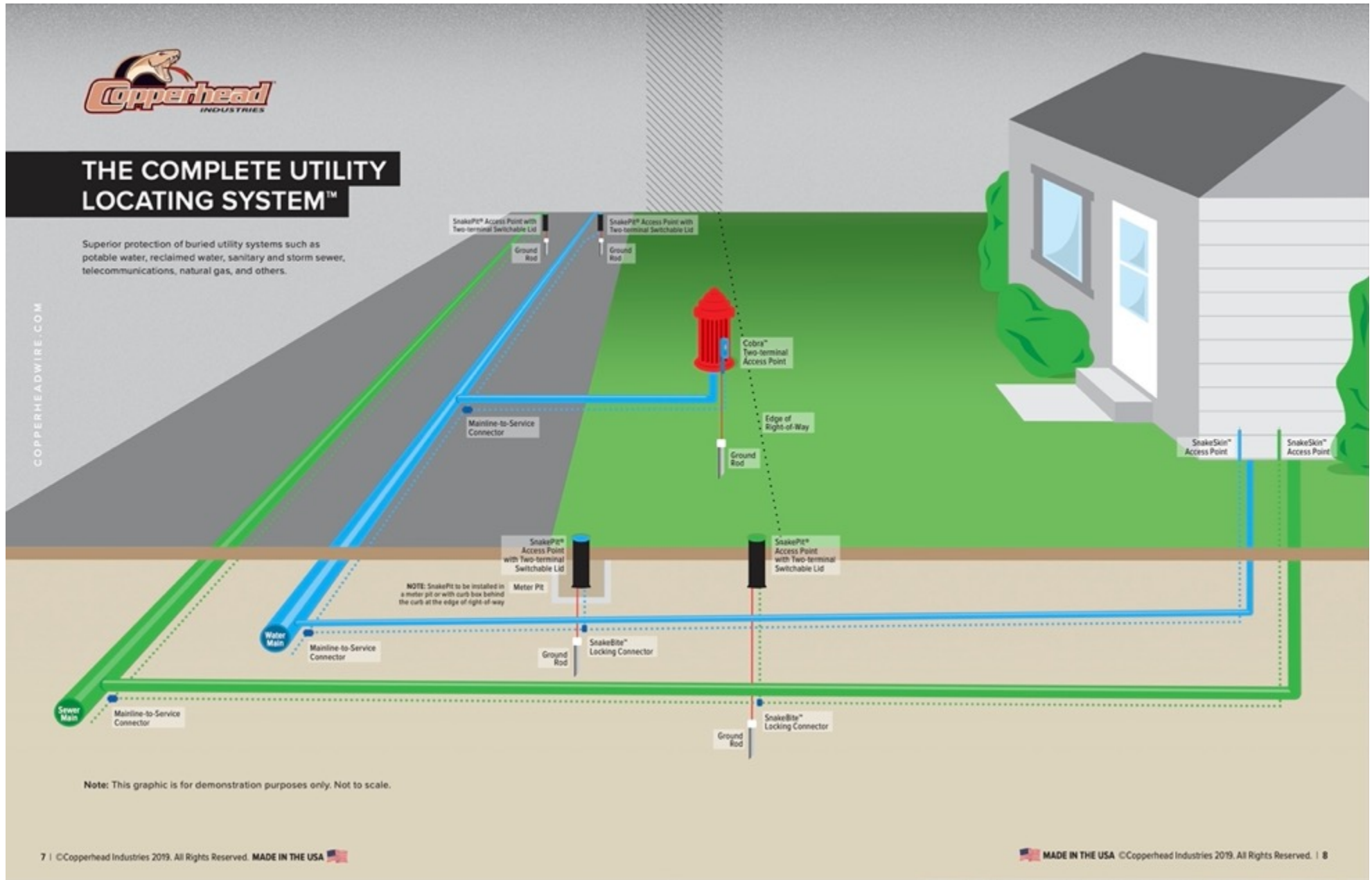
OPTIONAL EQUIPMENT



ViperMag Hard Case

ViperMag™ Pipe and Cable Locator

- Active locating frequencies (512 Hz, 8.19 kHz, 83 kHz)
- Passive power locating (60 Hz)
- Conductive or inductive locating
- Ferrous metal detection – magnetic north/south indicator
- Optional fault find mode (8 kHz)



TRACER WIRE

Product Name	Part Number	Application	Wire Gauge	Spool Size	Break Load	Coating Thickness
SuperFlex	1830*-SF-**	Open Cut	18 awg	500, 1000, 2500	75 lb	30 mil
SuperFlex	1845*-SF-**	Open Cut	18 awg	500, 1000, 2500	75 lb	45 mil
SuperFlex	1630*-SF-**	Open Cut	16 awg	500, 1000, 2500	115 lb	30 mil
SuperFlex	1645*-SF-**	Open Cut	16 awg	500, 1000, 2500	115 lb	45 mil
SuperFlex	1430*-SF-**	Open Cut	14 awg	500, 1000, 2500	194 lb	30 mil
SuperFlex	1445*-SF-**	Open Cut	14 awg	500, 1000, 2500	194 lb	45 mil
SuperFlex	1230*-SF-**	Open Cut	12 awg	500, 1000, 2500	302 lb	30 mil
SuperFlex	1245*-SF-**	Open Cut	12 awg	500, 1000, 2500	302 lb	45 mil
SuperFlex	1030*-SF-**	Open Cut	10 awg	500, 1000, 2500	513 lb	30 mil
SuperFlex	1045*-SF-**	Open Cut	10 awg	500, 1000, 2500	513 lb	45 mil
High Strength	1830*-HS-**	Open Cut	18 awg	500, 1000, 2500	107 lb	30 mil
High Strength	1845*-HS-**	Open Cut	18 awg	500, 1000, 2500	107 lb	45 mil
High Strength	1630*-HS-**	Open Cut	16 awg	500, 1000, 2500	144 lb	30 mil
High Strength	1645*-HS-**	Open Cut	16 awg	500, 1000, 2500	144 lb	45 mil
High Strength	1430*-HS-**	Open Cut	14 awg	500, 1000, 2500	282 lb	30 mil
High Strength	1445*-HS-**	Open Cut	14 awg	500, 1000, 2500	282 lb	45 mil
High Strength	1230*-HS-**	Open Cut	12 awg	500, 1000, 2500	452 lb	30 mil
High Strength	1245*-HS-**	Open Cut	12 awg	500, 1000, 2500	452 lb	45 mil
High Strength	1030*-HS-**	Open Cut	10 awg	500, 1000, 2500	684 lb	30 mil
High Strength	1045*-HS-**	Open Cut	10 awg	500, 1000, 2500	684 lb	45 mil
High Strength	830*-HS-**	Open Cut	8 awg	500, 1000, 2500	830 lb	30 mil
High Strength	845*-HS-**	Open Cut	8 awg	500, 1000, 2500	830 lb	45 mil
SoloShot EHS	1245*-EHS-**	Directional Drill	12 awg	500, 1000, 2500	1150 lb	45 mil
SoloShot EHS	1045*-EHS-**	Directional Drill	10 awg	500, 1000, 2500	2032 lb	45 mil
SoloShot EHS	845*-EHS-**	Directional Drill	8 awg	500, 1000, 2500	2785 lb	45 mil
SoloShot Xtreme	PBX-50*-**	Pipe Burst and Critical Bores	3/16" 7x7 stranded CCS	Custom min qty 500'	4700 lb	50 mil
SoloShot Burst	3/16"-PB-**	Pipe Burst	3/16" 7x19 stranded stainless steel	Custom min qty 500'	3700 lb	45 mil

*Denotes Color: B=Blue, G=Green, P=Purple, N=Orange, R=Red, W=White, Y=Yellow, K=Black **Denotes Spool Length: 500', 1000', 2500'

CONNECTORS

Product Name	Part Number	Application	Package Quantity
SnakeBite Locking Connector	LSC1030C*	Main splice and/or service line, 10 awg	Jar qty of 10, 25 or bulk box of 100
SnakeBite Locking Connector	LSC1230C*	Main splice and/or service line, 12 awg	Jar qty of 10, 25 or bulk box of 100
SnakeBite Locking Connector	LSC1430C*	Main splice and/or service line, 14 awg	Jar qty of 10, 25 or bulk box of 100
Twist-on Connector - Regular	SCB-01*	Main splice or dead end	Pkg qty 20 or bulk box of 100
Twist-on Connector - Large	SCB-01-LG	Main splice or termination	Pkg qty 8
Mainline-to-Service Connector	3WB-01	Mainline to service line	Pkg qty 10
Pipe Burst Connector - In-line splice	SC-PB-01	Main splice	Pkg qty 1
Pipe Burst Connector - Three-way	SC-3WPB	Main splice and/or service line	Pkg qty 1

*Denotes BULK (box of 10), CTR25 (jar of 25), CTR10 (jar of 10)

GROUND ROD

Product Name	Part Number	Application	Wire Gauge
Ground Rod	ANO-12	Tracer wire grounding	12 awg
Ground Rod	ANO-14	Tracer wire grounding	14 awg

ACCESS POINTS

Product Name	Part Number	Application	Terminals	Dimension
SnakePit Lite Duty, Single-Terminal	LD14*TP	Ground level, non-roadway, lite duty	1	14.5" L
SnakePit Lite Duty, Two-Terminal Switchable	LD14*2T-SW	Ground level, non-roadway, lite duty	2, Switchable	14.5" L
SnakePit Lite Duty Adjustable, Single-Terminal	LD14*TP-ADJ	Ground level, non-roadway, fluctuations in grade	1	18.625" - 24" L
SnakePit Lite Duty Adjustable, Two-Terminal Switchable	LD14*2T-ADJ-SW	Ground level, non-roadway, fluctuations in grade	2, Switchable	18.625" - 24" L
SnakePit Lite Duty XL Adjustable, Single-Terminal	LDXL36*TP-ADJ	Ground level, non-roadway, heavy soil shifting	1	36.25" - 41.625" L
SnakePit Lite Duty XL Adjustable, Two-Terminal Switchable	LDXL36*2T-ADJ-SW	Ground level, non-roadway, heavy soil shifting	2, Switchable	36.25" - 41.625" L
SnakePit Concrete/Driveway, Single-Terminal	CD14*TP	Ground level, low traffic, driveway	1	14.5" L
SnakePit Concrete/Driveway, Two-Terminal Switchable	CD14*2T-SW	Ground level, low traffic, driveway	2, Switchable	14.5" L
SnakePit Roadway, Single-Terminal	RB14*TP	Ground level, roadway	1	17" L
SnakePit Roadway, Two-Terminal Switchable	RB14*2T-SW	Ground level, roadway	2, Switchable	17" L
SnakePit Bracket	SP-BRACKET	Secures SnakePit to curb box	--	
Cobra	T1*	Above ground	1	Fits 1" conduit
Cobra	T2*	Above ground	2	Fits 1" conduit
Cobra Hydrant Flange	HYDFL	Mount Cobra to fire hydrant	--	Fits 3/4", 5/8" 1/2" bolts
Cobra Hydrant Flange Package	TV2*-FLPKG	Includes Cobra (1 or 2-terminals), flange, 1" NPT thread	1 or 2	Fits 3/4", 5/8" 1/2" bolts
Cobra Mounting Stake	T3-STAKE	Mount Cobra in any location	--	
SnakeSkin	SNSK-*01 SNSK-*BULK25	Above ground	1	Pkg qty 1 Bulk qty 25

*Denotes Color: B=Blue, G=Green, P=Purple, N=Orange, R=Red, Y=Yellow, K=Black

LOCATOR

Product Name	Part Number	Application	Contents
ViperMag Pipe and Cable Locator	VIP-MAG	Location of buried pipe and cable	Receiver, transmitter, direct connect cables, ground rod, batteries, soft-side case, user guide
ViperMag Hard Case	VIP-CASE	Storage and protection of ViperMag Pipe and Cable Locator and contents	Case only with custom cut foam inserts
Induction Clamp	VIP-CL2/4/5	Apply locating signal to metal pipe when no tracer wire is present	2", 4" or 5" Induction Clamp
A-Frame Locator	CI-A-Frame	Fault finding	A-Frame, soft-side bag, USB cable, user guide

OTHER PRODUCTS

Product Name	Part Number	Application
Service Ready Kit	SRK-*01	Kit contains: 100' CCS Tracer Wire, Mainline-to-Service Connector, SnakeSkin Access Point, 2 SnakeBite Locking Connectors, 2 Ground Rods, SnakePit Lite Duty Access Point with Two-Terminal Switchable Lid.
Valve Cover Lifter	CI-VCL-100	Safely remove valve covers

*Denotes Color: B=Blue, G=Green

**PHYSICAL, MECHANICAL, AND ELECTRICAL PROPERTIES OF HIGH-DENSITY
POLYETHYLENE INSULATING JACKET**

High Density Polyethylene Insulator	ASTM Standard	Value
Density	(ASTM D 792)	0.943 g/cc
Bulk Density	(ASTM D 1895)	0.58 g/cc
Melt Index	(ASTM D 1238/E)	0.70 dg/min
Tensile-Yield	(ASTM D 638)	4300 psi
Tensile-Ultimate	(ASTM D 638)	2900 psi
Tensile-Elongation	(ASTM D 638)	850%
Flexural Modulus	(ASTM D 790/1)	120,000 psi
Hardness	(ASTM D 2240)	63 Shore D
Environmental Stress-Crack	(ASTM D 1693/B)	F20 > 48 h
Thermal Stress-Crack	(ASTM D2951)	F0 > 1000 h
Brittleness Temperature	(ASTM D 746)	< -95° F
Melting Point (DSC)	(ASTM D 3417)	262° F
Softening Point (Vicat)	(ASTM D 1525)	250° F
Oxidative Induction Time	(ASTM D 3895)	> 50 min. @ 200° C
Dielectric Constant	(ASTM D 1531)	2.34 @ 1MHz
Dissipation Factor	(ASTM D 1531)	0.00007 @ 1 MHz
Volume Resistivity	(ASTM D 257)	5 x 10 ¹⁷ ohm-cm
Dielectric Strength	(ASTM D 3755)	1000 volts @ 20 mils



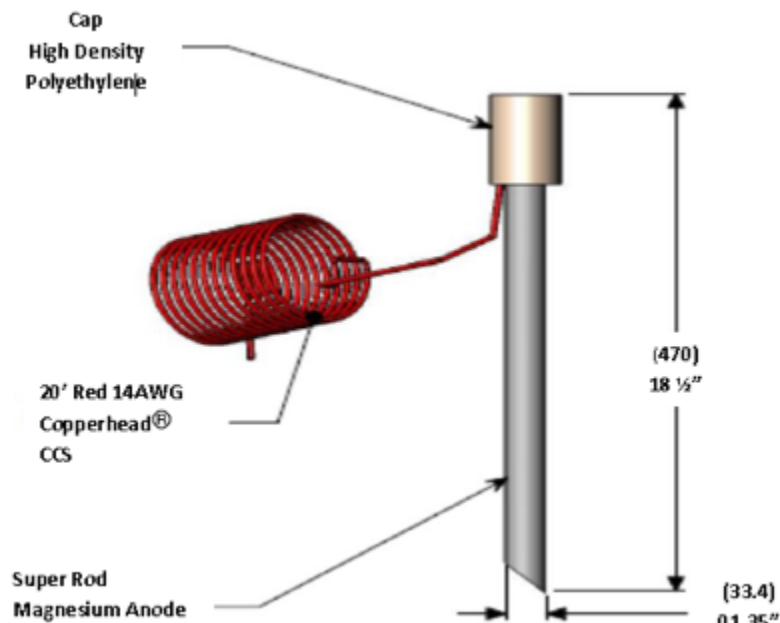
INSTALLATION INSTRUCTIONS COPPERHEAD DRIVE-IN MAGNESIUM ANODE

Anode:

- Use Copperhead Anode
- Part # **ANO-14**, 1.5# x 1.315" D x 18.5" L, Magnesium Drive in Anode.

Grounding a tracer wire system at all dead-end points completes the needed electrical circuit for accurate locates. This will significantly enhance your signal strength and pinpoint your tracer wire to its target.

Your Copperhead Anode includes a HDPE cap and 20' of factory installed Copperhead red 14 AWG copper clad steel tracer wire with minimum 282# break load and 30 mil high-density high molecular weight polyethylene (HDPE) insulation. The factory installed wire is also rated for direct burial use at 30 volts with 21% conductivity. HDPE insulation shall be RoHS compliant and utilize virgin grade material. Package includes one Copperhead SnakeBite™ connector, part # SCB-01-SR, which is filled with non-hardening, dielectric, moisture displacement silicon for corrosion protection. The connector is provided to splice the factory installed anode tracer wire to the mainline tracer wire. The Copperhead Anode described above must be used or a **pre-approved equal** and made in the USA.





Installation Instructions:

Tools needed: flathead screwdriver, pentagon wrench, wire stripper, small adjustable or 7/16" wrench and shovel to install SnakePit.

- 1) Using pentagon wrench, remove cast lid and set aside, remove wax pad for later use.**
- 2) Remove ½" of coating from wire end(s) to be connected to SnakePit brass nut on bottom of cast lid.**
- 3) Wrap 18-24" of tracer wire around outside of box to form spring-like shape. This will allow enough wire to remove cast lid with ease later, if needed. Remove wire from outside of box and guide inside the box from bottom up.**
- 4) Loosen lower screw on cast lid, exposing opening in nut. Place stripped wire end(s) into brass nut assembly opening from inside out and firmly tighten connection.**
- 5) Remove wax pad from bag and wrap the wire connection to keep out moisture and contaminants. It's important to always protect any exposed tracer wire throughout your system installation.**
- 6) Feed exposed tracer wire back inside box at same time replacing cast lid and tighten pentagon nut to secure cast lid to body.**
- 7) Bury SnakePit at ground level.**

Copperhead Industries, LLC P.O. Box 1081 Monticello, MN 877.726.5644 www.copperheadwire.com

APPENDIX B - QUALITY CERTIFICATIONS

A copy of the following Quality Assurance Certificate is available from WSAA.

TABLE B1 COPPERWELD METALLICS LLC– MANAGEMENT SYSTEMS

254 Cotton Mill Road Fayetteville Tennessee USA	
Quality Systems Standard	ISO 9001:2015
Certification Licence No.	94-201j
Certifying Agency	Intertek
First Date of Certification	2 June 1994
Current Date of Certification	29 April 2021
Expiry Date of Certification	28 April 2024

CERTIFICATE OF REGISTRATION

This is to certify that the management system of:

Copperweld Bimetallics, LLC.

Main Site: 254 Cotton Mill Road, Fayetteville, Tennessee, 37334, United States

has been registered by Intertek as conforming to the requirements of:

ISO 9001:2015

The management system is applicable to:

Manufacturing of copper-clad steel and copper-clad aluminum wire.

Certificate Number:

94-201j

Initial Certification Date:

02 June 1994

Date of Certification Decision:

29 April 2021

Issuing Date:

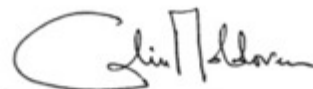
29 April 2021

Valid Until:

28 April 2024



Intertek



Calin Moldovean

President, Business Assurance

Intertek Testing Services NA, Inc.
900 Chelmsford Street, Lowell
MA 01851, USA



In the issuance of this certificate, Intertek assumes no liability to any party other than to the Client, and then only in accordance with the agreed upon Certification Agreement. This certificate's validity is subject to the organization maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone. The certificate remains the property of Intertek, to whom it must be returned upon request.



APPENDIX C - SUPPLIER CONTACTS

Tapex Industrial Pty Ltd

200 Kingsgrove Road

Kingsgrove NSW 2208

Phone: +61 2 9502 6000

Email: sales@tapex.com.au

Website: <https://www.tapexindustrial.com.au/digsafe-range/copperhead/>

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Telephone 1 (877) 726 5644

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