



HOCKWAY™

The highest quality Cathodic Protection for buried and submerged pipelines



HOCKWAY
PIPELINES

www.hockway.com



The highest quality Cathodic Protection for buried and submerged pipelines.

Hockway supply the highest quality Cathodic Protection for buried and submerged pipelines as an effective secondary defence after factory and field applied coatings



Planning lasting pipeline protection

Coating damage happens either during construction, movement or just through coating deterioration, leaving exposed areas that can only be protected by CP.

So our CP systems consider:

- Coating system applied
- Age of pipeline and coating system
- Soil type and corrosivity
- Rural or urban areas
- Pipeline routing
- In-line valves or take-offs
- Power availability

Site Survey

On new pipelines a route survey is required to gather soil resistivity data, identify groundbed locations, test facility locations and possible problem areas such as high voltage AC powerlines, DC traction lines and foreign pipeline crossings. Quality CP systems take into account many factors. As a rule of thumb however, the following could apply:

Characteristic	CP system
0-20 km length	Sacrificial
20+ km length	Impressed
New plastic coating, new high grade coatings	Sacrificial
Old Coatings	Impressed
Rural	Use of solar power/wind Remote monitoring and control
Corrosive Soil	Impressed with temporary sacrificial during construction

CP solutions

Sacrificial

We supply:

- **Galvanic Anodes** to provide temporary CP during the construction phase or for permanent protection on short well coated pipelines.
- **Magnesium Anodes** for medium resistivities (5000-10000 Ω cm)
- **Zinc Anodes** for low resistivities and in brackish water less than 1000 Ω cm

Recommendation:

We recommend two anodes are installed at any one location as distribution coverage can be limited. The number of anodes you need to protect a pipeline depends on its characteristics. Older pipelines typically need more CP, with more test stations with higher potential (-1.7v) anodes. For temporary protection use smaller magnesium anodes or zinc anodes. You can use ingots or ribbon anodes depending on the construction. Anode ingots are easier to install at test point locations but ribbon is more beneficial in desert locations.

For AC Mitigation

We supply Zinc Ribbon anodes to directly bond to the pipeline or connect through an earth leakage device/DC Decoupler to mitigate AC interference.

Impressed

Our impressed CP systems typically include:

- Power supply unit
- Anodes or Groundbeds
- Test Facilities
- Single core cable

Coverage is up to 50 -100km and extra CP systems are required on long or multi pipelines or in congested areas. The power supply generates an adjustable voltage of 0-50Vdc to drive a DC current through a groundbed of anodes.

Protection levels can be measured and monitored at test stations situated at regular accessible and critical locations along the pipeline route.

System Life

ICCP – 25 years +
Permanent SAC – 15 years
Temporary SAC – 2-5 years

Power Supply

These can vary depending on the location.

Where AC is available a transformer rectifier can be used for:

- Hot environment – oil cooled
- Mild building – air cooled
- Low output – switch mode power supplies
- Remote monitoring/control – constant current / current voltage / fully automatic

Where AC is not available a DC DC unit can be used, powered by:

- Solar
- Wind

DC DC converters can also be used with remote monitoring and control.

Groundbed

These can be a borehole or horizontal depending on;

- Soil resistivity
- Area – urban, land issues, etc

Groundbeds can be located 100m from the pipeline and 300m other pipelines and metallic structures. Headworks are often required to ease installation, vent the borehole and mount the anode junction box.

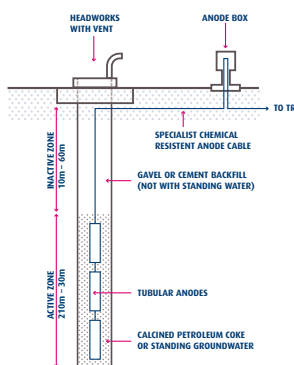
The Pros and Cons of Borehole and Horizontal Groundbeds:

Borehole

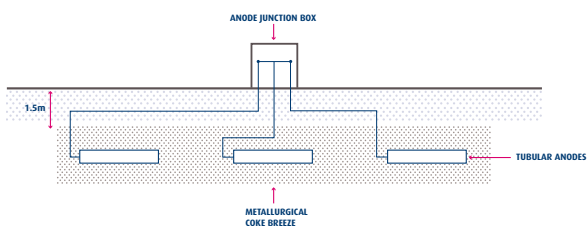
- More costly to install
- Casing required in desert locations
- Better current distribution
- Fewer or no land issues
- Required in high resistivity areas
- Can be open hole if wet or backfilled with calcined coke

Horizontal

- Easy and cheap to install
- Not suitable for desert or high resistivity locations
- Also used for AC/DC mitigation
- Typically whole bed surrounded in coke breeze to reduce resistance



BOREHOLE GROUNDBED



HORIZONTAL GROUNDBED

High quality Anodes

MMO Titanium tubes

- Typically on a string (1 cable) or individually tailed
- Light weight and easy to install
- Long lasting

Silicon Iron (SiFe)

- Individually tailed only
- Heavier – handling issues
- Prone to damage if not handled correctly
- Cheap

In all cases anodes can be used bare or as canistered coke filled.

Monitoring Stations

At Hockway we design and build Test Stations to monitor CP. We tailor our test stations to suit your needs and environment.

Typically galvanised steel poles with terminals. Located in rural locations every 1km or 2km, at road, rail, river/dry crossings and for new line HV Power line crossings.

Junction Boxes

- Anode junction boxes terminate anode cables and monitor current on individual cables.
- Junction Boxes for multi-pipelines and possible bonding to foreign pipelines, rail tracks etc.

Permanent Reference Electrodes

- Improves constancy in comparative data
- To monitor potentials easily
- For remote monitoring
- To control potential on an automatic power unit
- Read potentials in inaccessible/hard to reach locations
- Saves monitoring time versus portable electrodes
- We supply: Copper Copper Sulphate for low chloride soils, Silver Silver chloride for chloride areas

Coupons

Ideal for monitoring IR Free potentials without switching off all CP systems simultaneously.

- Used in critical areas eg; wet marshy areas, in process plants and foreign crossings
- Used with remote monitoring system

Pipeline Isolation

For CP to work effectively the pipeline must be fully isolated. Isolation joints are the most reliable and effective means to isolate the pipeline at above and below ground interfaces.

To prevent flashover during lightning or electrical faults protection devices should be used such as spark gap and overvoltage protection devices. Any inline valves also need to be isolated using isolated cable bushings and dielectric couplers. The valves however must be earthed; this is possible using DC Decouplers. To prevent flashover we supply;

- Spark gap arrestors – DC fault conditions
- Overvoltage devices (OVP) – designed for CP use. Diverts AC and DC fault current conditions
- Earth leakage devices or DC Decoupler. Diverts DC fault and AC steady state and fault instances

Monitoring and managing

All CP systems must be regularly monitored to ensure continued performance. Hockway provide comprehensive monitoring services and CP database and asset management on your behalf.

Remote Monitoring and Control

At Hockway we offer the unique capability of incorporating remote monitoring and control units in your equipment.

Our systems are tailored to your needs. Typical units include:

- WatchdogCP™ and CARMS systems
- Internet driven – no need for software; sends data into CPDM
- Inmarsat Satellite communication
- Capability to tie in SCADA system

Pipeline issues encountered

Hockway are able to consult, survey, engineer and supply equipment to overcome modern day pipeline issues that could lead to premature pipeline failure.

AC induced current

Issue is AC generated on the pipeline by High Voltage power lines in close proximity

- Safety issues
 - electric shock for operators, cattle etc
 - Fault over isolation, damaging to equipment
 - Spark hazard
- Corrosion on pipeline regardless if CP applied or not

Solution:

- Pipeline route to avoid parallel run with HV power lines.
- AC Mitigation analysis and deployment of DC decouplers

DC Traction

Issues:

- Interference from traction DC caused by rail leakage to ground
- Premature pipeline failure

Solution:

- Pipeline route to avoid DC traction areas
- Bonding to rails through resistors and diodes

Foreign Service Buried Pipeline and CP systems

Issues:

- Interference from CP systems
- Under protection leading to corrosion
- Anodic effect
- Over protection

Solution:

- Pipeline route to avoid multi pipeline crossings
- Pipeline route to avoid existing groundbeds
- Relocate existing groundbeds
- Bond to existing CP systems using resistors, shunts and diodes

Hockway's recommended system with remote control for a hot desert location:

- Constant current/constant voltage oil cooled transformer rectifier/solar powered CPU with WatchdogCP RMU
- Deepwell borehole groundbed 60m – 100m deep with string of 5no. MMO Titanium tubular anodes backfilled with calcined coke
- Anode junction box complete with shunts
- Negative junction box/distribution
- Bond junction boxes
- Standard test facilities set every 1km, road crossing
- AC mitigation, DC decoupler and zinc earth groundbeds in HV Powerline areas
- Negative and positive 16, 35, 50 or 90mm² cable
- Bonding cable 16mm²
- Test Cable 10mm²

Contact

Hockway UK Head Office

Trowers Way Centre, Holmethorpe, Industrial Estate
Redhill, Surrey RH1 2LP, United Kingdom
Tel: +44 (0) 1737 762222 Fax: +44 (0) 1737 236100
Email: enquiries@hockway.com

Hockway Aberdeen

7 Queens Gardens, Aberdeen AB15 4YD
United Kingdom
Tel: +44 (0) 1224 443523 Fax: +44 (0) 1224 626227
Email: enquiries@hockway.com

Hockway Italy

C.so Martiri della Liberta, 17
15076 – OVADA – AL – ITALIA
Tel: +39 (0) 143 81444 Fax: +39 (0) 143 81444
Email: ecampedelli@hockway.com

Hockway UAE

P.O. Box 10559, Ras Al Khaimah
United Arab Emirates
Tel: +971 (0) 7 2444923 Fax: +971 (0) 7 2444932
Email: sales@hockway.com
