

**PIPELINE ACCESSORIES**

**Kirk Polarisation cells**

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German Cathodic Protection



**Protection Against Dangerous Voltage**

Induced alternating current, lightning strikes, and grounding fault current on buried pipelines not only pose serious safety threats to pipeline operators and contractors, they can also cause major damage to buried pipelines.

Kirk grounding cells control these hazardous voltages while permitting lower level cathodic protection voltage to flow. The cells do not possess an internal voltage. Instead they act as an electrochemical switch to shunt dangerous voltage to ground. They consist of multiple pairs of stainless steel plates, which are immersed in a 30 percent potassium hydroxide solution. An oil seal is also added to prevent evaporation and limit foaming of the electrolyte solution under high current flow.

When low levels of DC current flow through the grounding cell, a film of hydrogen gas forms on the negative plates of the Kirk cell. At the same time a film of oxygen gas forms on the positive plates. This polarisation allows the low level DC voltage associated with cathodic protection to develop. As the applied voltage across the cell increases from either AC or higher DC current, the polarisation film on the plates breaks down and the Kirk cell conducts current.

Kirk grounding cells can be installed above or below grade. For exterior installations, a series of galvanized steel enclosures are offered which are in conformity with the EN-Standards or NEMA and 3R. The cells are shipped with a dry package of potassium hydroxide and can be stored indefinitely in clean, dry locations.

**Typical Applications**

Kirk grounding cells control the flow of potentially dangerous AC and DC current on buried metallic structures. They are often used on buried oil, gas, and water pipelines that share the same right-of-way as high voltage power lines. Because the cells produce various gases that can be explosive, they should be installed with proper venting.

They should also be routinely inspected to ensure adequate electrolyte levels are present.

The cells can be operated in temperatures ranging from -40°F to 140°F (-40°C to 60°C).



**K-50 KIRK CELL PERFORMANCE TABLE**

Delta E Across Cell Terminals	Resultant Current Flow	Apparent Internal Impedance (Ω)
<b>DIRECT CURRENT DATA</b>		
0.15 V	100 μA	1500
0.42 V	2 mA	210
0.46 V	4 mA	115
0.50 V	6 mA	83
0.53 V	8 mA	66
0.59 V	10 mA	59
0.86 V	20 mA	43
1.00 V	30 mA	33
1.20 V	50 mA	24
1.30 V	100 mA	13
1.72 V	500 mA	3.4
1.76 V	1 A	1.8
1.82 V	5 A	0.36
1.85 V	10 A	0.19
2.15 V	100 A	0.022
2.65 V	500 A	0.053
3.15 V	1 kA	0.0032
<b>ALTERNATING CURRENT DATA</b>		
0.01 V	500 mA	0.02
0.02 V	1 A	0.02
0.04 V	5 A	0.01
0.20 V	10 A	0.02
0.58 V	50 A	0.012
0.62 V	100 A	0.0062
1.30 V	500 A	0.0026
10.6 V	14 kA	0.00076
12.5 V	38.5 kA	0.00032
14.0 V	44.0 kA	0.00032
15.0 V	52.5 kA	0.00029
17.0 V	58.0 kA	0.00029
19.9 V	64.0 kA	0.00031



Further Kirk cells available: Type K-5A and K-25

To order the right cell for your application, indicate your requirements and specify the technical basis data.

We will build special enclosures or other items in connection with cells to customer specifications.