

# CORROSION SENSOR FOR DETECTING GRAPHITIZATION OF LIVE CAST IRON WATER MAINS



## WATER MAIN BREAKS

Water main failures are very expensive for municipalities because they typically result in expenses associated with repair costs, flood damage, and loss of revenue to affected businesses. Water main failures also interrupt the operation of vital services, such as medical care and fire-fighting operations. Currently, millions of dollars are spent annually by industry and by municipalities on the repair of failed components of the water distribution infrastructure, such as components that are made from gray cast iron or "gray iron" pipe.

Water main failures can be avoided by following Matergenics corrosion control program. By using our corrosion control program, areas with low to severe corrosion can be identified and excavated. Matergenics graphitization sensor device can be used to check the potentials on the live watermain at the susceptible areas of corrosion. Moreover, the extent of corrosion on the live watermain at the susceptible areas of corrosion can be checked. The collected data will aid in decision making whether to continue the watermain in service or to cut the corroded pipe section and install a new pipe section.

Two provisional patent applications for the sensor invention were filed. The first application, entitled "Non-Destructive Testing System for Detecting Graphitization of Iron", was filed on August 23, 2019 and was assigned U.S. Patent Application No. 62/890,676. The second patent application, also entitled "Non-Destructive Testing System for Detecting Graphitization of Iron", was filed on May 18, 2020 and was assigned U.S. Patent Application No. 63/026,366.



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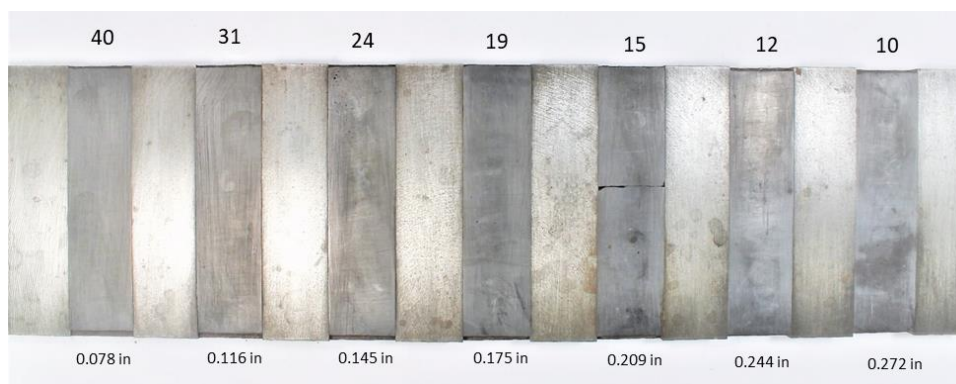
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# › MATERGENICS CAPABILITIES FOR ANALYSIS OF WATER MAIN BREAKS



The photo above shows the calibration standard. Graphite strips of varying thickness are placed in a plate of gray cast iron. The thickness of each graphite strip is listed at the bottom and the reading from the probe are listed at the top. If the probe is placed on the gray cast iron, it will read "100".

This sensor is also equipped with a copper-copper sulfate reference electrode which can measure the corrosion potential of any area on the pipe. This will also aid in finding graphitic areas along the pipe as the measurements will be less negative than that of the gray cast iron.

Switching between the graphitization probe and the reference electrode is done with a simple twist of the wrist! Both probes are mounted in an easy to use handle which allows for quick switching. The display always shows the readings from both probes simultaneously to make measurements even easier.



This sensor has a battery life of 100 hours using lithium batteries and when turned off the batteries should last in excess of 2 years.

What this new sensor can detect for you:

- Presence of Graphitization
- Extent of Graphitization
- Corrosion Condition Assessment
- Corrosion Survey
- Accelerated Corrosion
- Stray Current



The Matergenics approach to Water Main failure:

- Construct GIS Soil Corrosivity Maps for water Lines in your service territories
- Prioritize pipelines for corrosion risk, "water main Breaks" based on Corrosion map. Age, criticality, and consequence of failures
- Perform direct assessment by Matergenics Corrosion Sensor (**Zee Probe**): presence or absence of graphitization and the extent of graphitic corrosion. This will quantify the corrosion risk and provide useful information as replacement, repair, or no action
- Develop a long-term corrosion risk assessment and corrosion mitigation plan based on these assessments.
- Improve and update prisonization based on test results and scheduled maintenance
- Matergenics certified corrosion engineers can assist you on this important task to prevent water main failures.

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