TINKER & RASOR
1948 60 YEARS OF QUALITY 2008

PRODUCT INSTRUCTIONS

MODEL DIP-1 (Patent Pending)
DUCTILE IRON CORROSION SENSOR

Unpacking Checklist

The Corrosion Sensor Kit includes the following:

(1) Model DIP-1 Corrosion Sensor

(1) Cable, 10' flat ribbon, 15' round jacketed (attached)

(1) 6 Pin, standard ER connector (attached)

(1) Calibration/ Serial sticker (attached)

(1) Use and Installation instructions

(1) Calibration Certificate

Tel: (909) 890-0700 Fax: (909) 890-0736
P. O. BOX 1667 SAN BERNARDINO, CA 92402
Web: www.tinker-rasor.com E-mail: Info@tinker-rasor.com

PRODUCT INSTRUCTIONS

INSTALLATION PROCEDURES

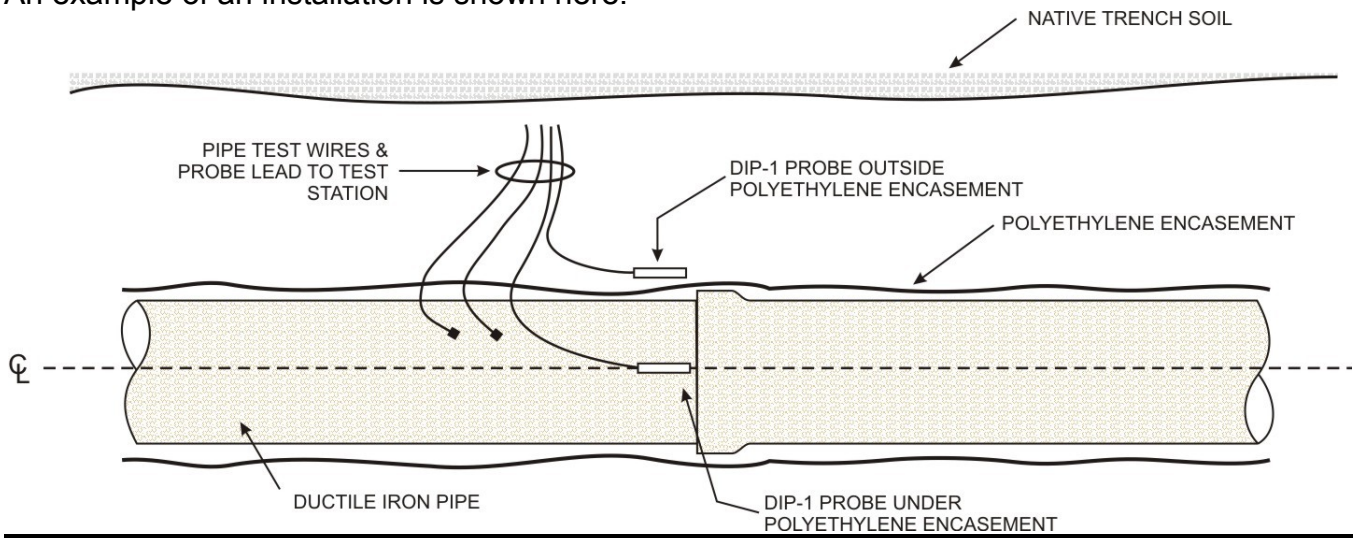
The Model DIP-1 probes have a 10-foot length of flat ribbon cable attached to the sensor with the other end spliced to a 15-foot length of round PVC jacketed cable which in turn is terminated with a standard 6-pin connector compatible with standard ER instruments.

For mounting the probes under polyethylene encasement, a small amount of adhesive is used to attach the probe to the pipe at the desired location. This adhesive should be applied only to the back (smooth) side of the probe. The ribbon cable should be dressed flat along the surface of the pipe to the point where it exits the encasement*. Handle the ribbon cable with care as it can be damaged by mistreatment.

The round PVC cable can be routed so as to locate the connector conveniently for protection from the environment and to facilitate the taking of subsequent probe readings. The Model T-3 CP Test Station is recommended for this purpose.

If an instrument is on-site, initial readings should be taken. A reading after installation but prior to backfill should show a good “Check” number and the “Div” number should be close to the “Div” reading on the Calibration certificate (+/-5%). Another reading after backfill is recommended to ensure that no damage has occurred during backfill. This reading will be the baseline read against which all future readings are compared.

An example of an installation is shown here.



Note: The probes do not require that polyethylene encasement be used.

Tel: (909) 890-0700 Fax: (909) 890-0736
P. O. BOX 1667 SAN BERNARDINO, CA 92402
Web: www.tinker-rasor.com E-mail: Info@tinker-rasor.com

PRODUCT INSTRUCTIONS

USING THE DIP-1 SENSOR

The DIP-1 is an Electrical Resistance (ER) sensor with a Ductile Iron measurement element and a measurement span of approximately:

DIP-1 = 25 mils

Each measurement of the sensor provides a measure of cumulative metal loss due to corrosion. On the DIP-1 the annealing oxide coating resulting from the fabrication of the pipe has been preserved on the MEASURE element of the sensor. This better simulates the performance of ductile iron pipe as the annealing oxide is in itself a barrier to the corrosion process. Tests have shown that the oxide coating can significantly delay the onset of corrosion for several months or even years. These sensors in combination with other measurements such as pipe-to-soil potentials can be very useful in determining if and when cathodic protection should be employed.

Typically, the sensor is attached directly to the pipe (MEASURE element facing away from the pipe) with most common adhesives. After attachment, the polyethylene encasement can be pulled over the sensor and the sensor cable routed to the measurement location. Care should be exercised when backfilling to make sure that the flat ribbon cable is not damaged.

To best emulate corrosion occurring on the pipe, the sensor should be at the same electrical potential as the pipe. This can be accomplished by connecting the breakout lead at the instrument connector to the pipe. This is most easily done by connecting the breakout lead to one of the leads coming from the pipe at a potential test station. If corrosion measurements are being made in native soil; the native corrosion rate can be measured without making connection to the breakout lead and the corrosion rate under cathodic protection (CP) can be measured by connecting the breakout wire to the buried pipe or structure.

The sensor measurements can be taken with most industry standard ER instruments, i.e. Rohrback Cosasco Systems CHECKMATE™ or others. These instruments measure in “divisions” (Div) which represent 0.1% of the sensor span.

> An example of the steps necessary to take a read of a sensor using the CHECKMATE™ instrument:
> Connect the instrument cable to the sensor connector. Turn on the CHECKMATE™, choose *Read*, choose *Probe*, choose *Quick*, choose *D*. The instrument will respond with a *Div* number and *Chk* number.

(For the MS1500E, choose the CT 50 probe)

Tel: (909) 890-0700 Fax: (909) 890-0736
P. O. BOX 1667 SAN BERNARDINO, CA 92402
Web: www.tinker-rasor.com E-mail: Info@tinker-rasor.com

PRODUCT INSTRUCTIONS

The corrosion rate is the slope of the metal-loss curve and corrosion rates between any two measurements are easily calculated with the following equation:

$$\text{CORROSION RATE} = \frac{(R_f - R_i)}{1000} \text{ X (SPAN) X } \frac{365}{(\text{TIME})}$$

where- R_f = Final reading in divisions
R_i = Initial reading in divisions
SPAN = Sensor span in mils
TIME = Time in days between measurements

For the DIP-1 with a span of 25 mils, the above equation can be simplified to-

$$\text{CORROSION RATE (MPY)} = \frac{(R_f - R_i) \text{ X } 9.125}{(\text{TIME in days})}$$

It is recommended that the calculation of corrosion rates be performed only when the change of readings in divisions is greater than ten (>10) or the time between readings is one month or longer.

For all information regarding the use of an ER instrument, please refer to the instrument manufacturer's instructions.

Additional information may be found on the Tinker & Rasor website:
www.tinker-rasor.com

Please contact Tinker & Rasor with any questions or comments you may have regarding this or other Tinker & Rasor products.

Tinker & Rasor
PO BOX 1667
San Bernardino CA 92402
(909) 890-0700
Info@tinker-rasor.com

104-140