Installation, Operation, and
Maintenance Manual

Welker® Automatic Insertion Corrosion Coupon Device

Model

AID-1CC

The information in this manual has been carefully checked for accuracy and is intended to be used as a guide for the installation, operation, and maintenance of the Welker equipment described above. Correct operating and/or installation techniques, however, are the responsibility of the end user. Welker reserves the right to make changes to this and all products in order to improve performance and reliability.

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SPECIFICATIONS

1. GENERAL

1.1 INTRODUCTION

We appreciate your business and your choice of Welker products. The installation, operation, and maintenance liability for this product becomes that of the purchaser at the time of receipt. Reading the applicable *Installation, Operation, and Maintenance (IOM) Manual* prior to installation and operation of this equipment is required for a full understanding of its application and performance prior to use.*

If you have any questions, please call 1-800-776-7267 in the USA or 1-281-491-2331.

Notes, Cautions, and Warnings

Notes emphasize information or set it off from the surrounding text.

Caution messages appear before procedures that, if not observed, could result in damage to equipment.

Warnings are alerts to a specific procedure or practice that, if not followed correctly, could cause personal injury.

The following procedures have been written for use with standard Welker parts and equipment. Assemblies that have been modified may have additional requirements and specifications that are not listed in this manual.

1.2 DESCRIPTION OF PRODUCT

The Welker® Automatic Insertion Corrosion Coupon Devices are designed for use in systems where it is desirable to insert and retract a corrosion coupon within a pipeline while the pipeline remains pressurized. The design of the unit allows the operator to control the movement of the probe into and out of the pipeline safely through the use of four valves and an auxiliary gas supply, instrument air, or process fluid.

1.3 SPECIFICATIONS

The specifications listed in this section are generalized for this equipment. Welker can modify the equipment according to your company's needs. However, please note that ***the specifications may vary depending on the customization of your product.***

General	
Products	Gases/Liquids
Materials of Construction	316 Stainless Steel, Viton® and PTFE (others available)
Insertion Length	18", 24", 36" (45.72 cm, 60.96 cm, 91.44 cm) (others available in 6" increments)
Maximum Allowable Pressure *	1,440 psi @ -20° F to 100 ° F

* Maximum allowable temperatures and pressures may be lower depending on specifications of pipeline connection device.

SPECIFICATIONS

1.4 IMPORTANT INFORMATION

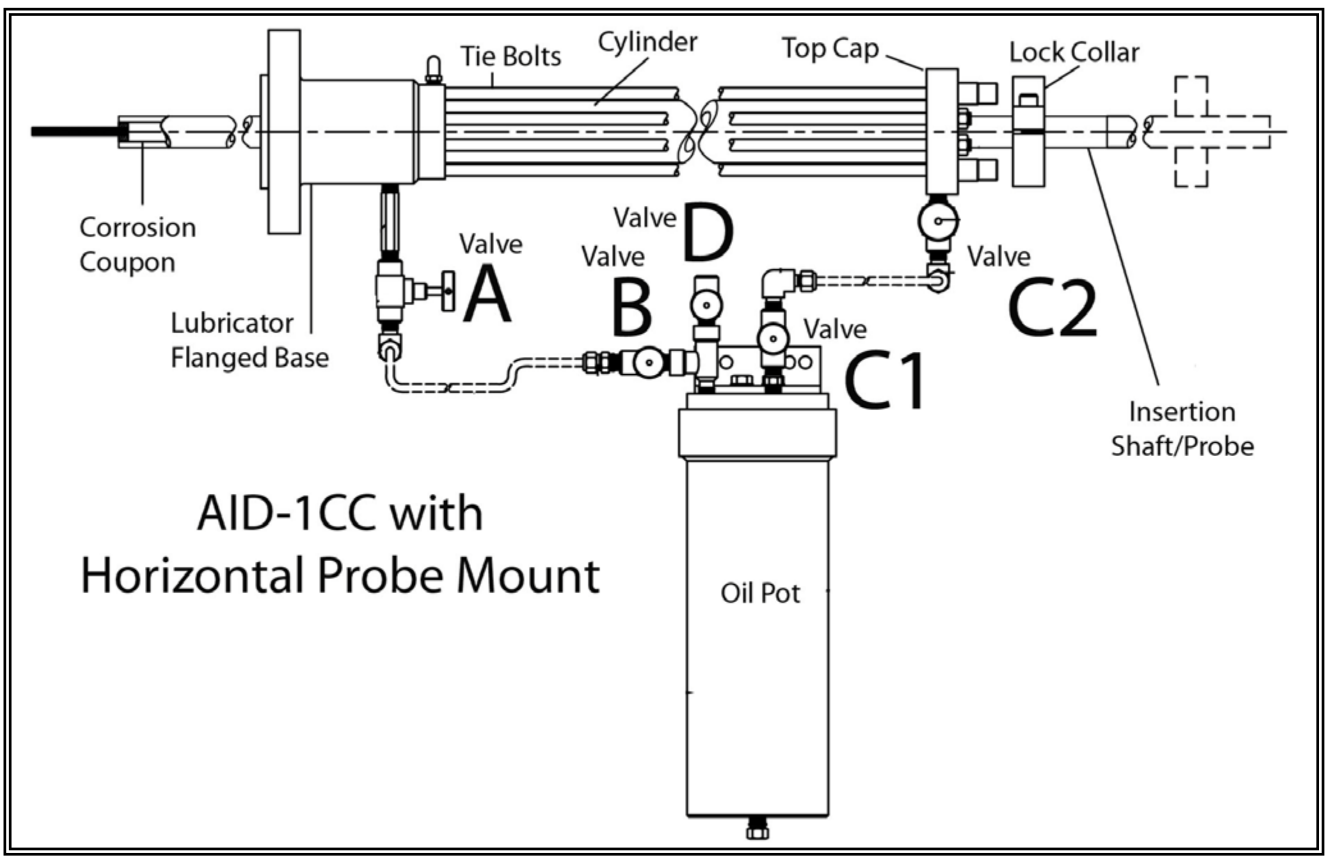
About the Oil Pot

With the use of a hydraulic oil pot, process or auxiliary pressure is applied within the pot in order to insert and retract the corrosion coupon from the pipeline. The oil in the pot is applied on the probe piston to assure a smooth travel. The pot is shipped from the factory with the necessary oil volume. It should be noted that the unit is also shipped from the factory with the assumption that the installation will be vertical. In cases where the unit is mounted horizontally, the operator will have to rotate the pot 90 degrees. *Further instructions are given in step five of section 2.2.*

The internals of the pot will not function properly if the pot is placed in a horizontal position.

In a pipeline with liquid service, Welker strongly recommends using an auxiliary gas supply in order to prevent damage to the cylinder and the oil pot.

1.5 DIAGRAM



Refer to this figure throughout entire manual.

2. INSTALLATION & OPERATION INSTRUCTIONS

2.1 General

After unpacking the unit, check it for compliance and for any damages that may have occurred during shipment.

Claims for damages caused during shipping must be initiated by the receiver and directed to the shipping carrier. Welker is not responsible for any damages caused from mishandling by the shipping company.

Recommended Tools

It would be advisable to have the following tools available for installation of the unit; however, tools used will vary depending on model.

- Measuring tape
- Small hex key set
- 6" adjustable wrench
- 10" adjustable wrench
- Flat blade screwdriver
- Permanent marker

2.2 Preparing the Unit for Installation

1. **Determine the insertion length**
   Before installing the probe, the length the insertion probe will need to travel inside the pipeline must be determined. Measure from the top of the pipeline's isolation valve to the desired depth of the pipeline (see Figure 2).

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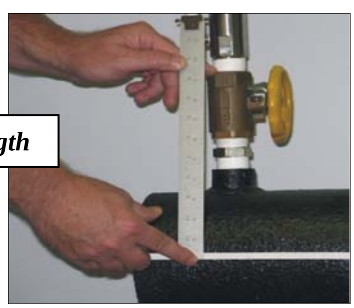
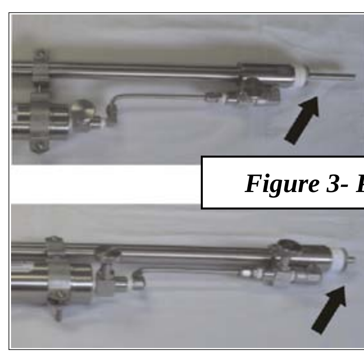


Figure 2 - Insertion Length



Not retracted

Retracted

Figure 3- Probe Retraction

2. **Set the insertion length on the probe**
   Once the insertion length of the probe is determined, this length should be measured on the probe itself.
   - Pull up on the probe to make sure it is fully retracted (see Figure 3).
   - Begin at the top cap, and measure up on the probe to the desired length.
   - Mark this point on the probe, as this is where the bottom of the lock collar will be positioned.

3. **Position the lock collar**
   - Remove the four hex cap holding screws from the top of the lock collar, and set aside.
   - Loosen the two set screws in the lock collar, and move the bottom of the collar to the position noted in the previous step.
   - Position the holes in the lock collar so that they are aligned with the four alignment nuts.
   - Tighten the two lock collar set screws.

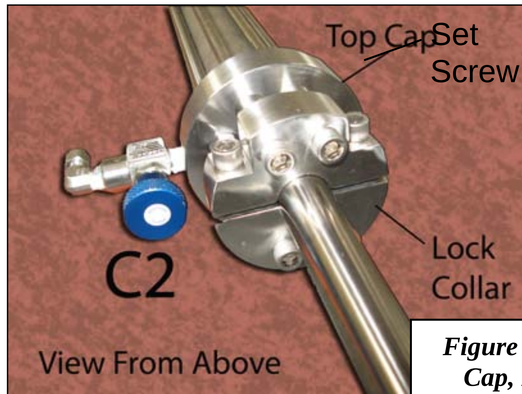


Figure 4- Top Cap, Lock Collar, and Valve C2

4. **If necessary, connect an instrument air or an auxiliary gas supply.** If the pipeline contains a liquid or toxic gas, you will need to use an alternative source for pressure.
   - Remove Valve A from the base cap or flange of the probe.
   - Plug the opening that is now in the base cap or flange with a $^{1}/_{4}$" NPT plug.
   - Connect the auxiliary gas supply to Valve B.

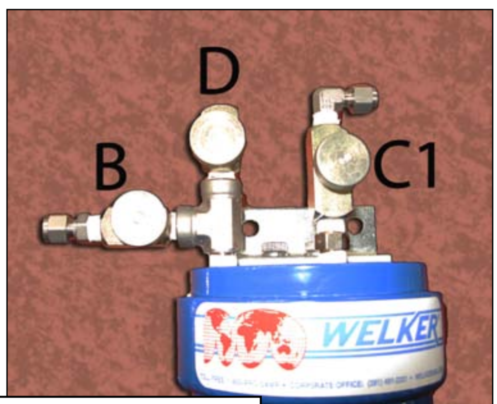


Figure 6- Oil Pot Valves

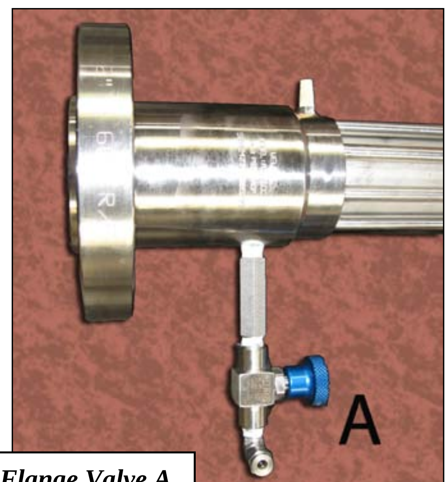


Figure 5- Flange Valve A

5. **If necessary, rotate the oil pot (for AID-1CC's shipped factory tubed with oil pot parallel to the AID for vertical probe mount).** If the probe needs to be mounted horizontally, the oil pot will need to be rotated so that it will remain vertical.
   - Loosen and detach the tubing between Valve B on the oil pot and Valve A on the base cap or flange of the unit.
   - Loosen the screws in the oil pot's clamp and remove the clamp from the pot.
   - Reposition the pot at a 90° angle, making sure Valve B is aimed downward.
   - Measure a new piece of tubing to be connected from Valve A to Valve B.
   - Replace the nuts and ferrules onto the ends of the new tubing.
   - Attach the new tubing onto Valves A and B.

6. **If necessary, tube from the AID to the oil pot (For AID-1CC's that are shipped with AID and oil pot separate.)**
   - Use ¼" tubing to tube from Valve A on the base cap or flange of the unit to Valve B on the oil pot.
   - Use ¼" tubing to tube from Valve C1 on the oil pot to Valve C2 on the top cap of the unit.

2.3 Installing the Unit

1. Connect the unit to the pipeline via the pipeline isolation valve; probe should be fully retracted and all valves should be closed.
2. **Slowly** open the pipeline isolation valve, and check for leaks. If you are using an auxiliary gas supply, open the supply valve.
3. Open Valves A on the base cap or flange and B on the oil pot to allow pipeline pressure to enter the oil pot.

   CAUTION! Valve D should always be closed when pipeline pressure is flowing through Valves A and B. Opening Valve D while pipeline pressure is flowing may cause the oil in the pot to erupt from the valve.

4. Open Valve C2 on the unit and then **slowly** open Valve C1 and located between the oil pot and the top cap. The probe will begin to insert into the pipeline.

   CAUTION! Opening the valve too quickly may cause the probe to insert harshly into the pipeline, possibly resulting in damage to the unit.

Note: During insertion, insure lock collar holes are properly aligned with tie bolts. Once the probe begins to move, there is no need to open the valve any further. This assures a slow and smooth insertion of the probe into the pipeline.

5. Tighten the four lock collar holding screws into the top cap.
6. Close Valves A, B, and C2, and C1 and check for leaks.
7. Check the entire system for leaks.
8. The unit is now in service.

2.4 Helpful Hints

1. Avoid rough handling of the unit and bending of the probe. The probe has a polished surface that travels through seals.
2. Operate the unit slowly and smoothly while inserting and retracting to avoid unnecessary slamming of the lock collar and/or the probe piston located inside the unit.
3. The most common cause for repairs to an automatic insertion device is due to the pipeline isolation valve closing on the probe while the probe is still inserted into the pipeline.
4. The entire unit should be treated with care.

INSTALLATION & OPERATION

2.5 RETRACTING THE UNIT

Make sure all valves on the unit are closed prior to installation or removal.

1. Open Valve A, B, and C1 and C2 to insure pressure is applied on the probe piston to hold the probe in the pipeline.

Do not yet close the pipeline isolation valve or auxiliary gas supply valve.

Before retracting the unit, note the pressure required for insertion in reference to the pipeline pressure.

2. Unscrew the lock collar screw in order to remove the lock collar from the top cap. At this point, the probe will remain inside the pipeline.

Valves A, B, C1, & C2 should always be closed when opening Valve D. Opening Valve D while pipeline pressure is flowing may cause the oil in the pot to erupt from the valve.

3. If you are using instrument air or an auxiliary gas supply, close the supply valve.

If the probe needs to be withdrawn from the pipeline but the unit itself does not need to be removed from the pipeline, stop at step 8.

If pressure does not stop venting from one or more of the unit's valves, the pipeline isolation valve is possibly leaking. User should consult on-sight safety engineer.

4. **Slowly** open Valve D. This will vent the air inside the oil pot into the atmosphere, relieving pressure on the probe piston.

5. Open Valve C2 and then **slowly** open Valve C1 to allow pressure to be relieved from the insertion actuator cylinder. The probe will now begin to retract from the pipeline.

Once the probe begins to move, Valve C1 does not need to be opened any further. This assures a slow and smooth retraction of the probe.

6. When the probe has completely retracted from the pipeline, close the pipeline isolation valve. Depressurize the unit.

7. Remove the unit from the pipeline isolation valve.

8. If you are using instrument air or an auxiliary gas supply, remove the unit from the supply.

3. MAINTENANCE

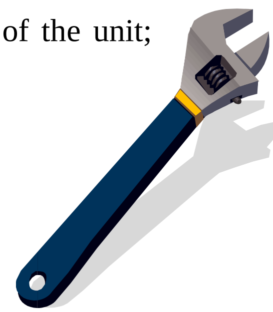
3.1 GENERAL

Prior to maintenance or disassembly of the unit, it is advisable to have a repair kit handy for the system in case of encountering wear or faulty seals. All maintenance and cleaning of the unit should be done on a smooth, clean surface.

Note: We recommend the unit have annual maintenance under normal operating conditions. In the case of severe service, dirty conditions, excessive cycling usage, or other unique applications that may subject the equipment to unpredictable circumstances, a more frequent maintenance schedule may be appropriate.

Recommended Tools

It would be advisable to have the following tools available for maintenance of the unit; however, tools used will vary depending on probe model.



- Small hex key set
- 6" adjustable wrench
- 10" adjustable wrench
- 10" channel lock pliers
- Fine grit sandpaper
- Flat blade screwdriver

Refer to Diagram on page 5 and Drawing AD784CS Attached in Appendix B throughout entire maintenance section.

3.2 DISASSEMBLY INSTRUCTIONS

1. Close Valves B, C1, C2 , & D on the oil pot and Valve A on the base or flange.
2. Disconnect the tubing between Valves A and B.
3. Disconnect the tubing between Valves C1 and C2 and remove the oil pot from the unit.
4. Unbolt the four hex cap screws (Part 15), and slide the lock collar (Part 8) off of the probe.
5. Unbolt and remove the four alignment nuts (Part 14) and four hex nuts (Part 16), and carefully slide the top cap (Part 7) off of the eight tie bolts (Part 10) and probe.

   CAUTION! Sliding the cap off of the probe too quickly can cause damage to the probe.

6. Remove the eight tie bolts (Part 10) from the base cap or flange (Part 1)
7. Mark the bottom end of the cylinder (Part 4) for reassembly.
8. Carefully remove the probe (Part 5) from the cylinder (Part 4).
9. Remove the base cap (Part 1) or flange from the cylinder (Part 4).

3.3 MAINTENANCE

Note: Follow your company procedure for removal and replacement (if applicable) of corrosion coupon.

1. Examine the inner surface of the cylinder for a smooth finish. If there are any pits or major scratches, the seals will leak. Call Welker for service options.
2. Examine the outer surface of the probe for a smooth finish.
3. Unscrew the corrosion coupon adaptor (Part 20), check internal bushing threads, and replace if necessary.

CAUTION! Do not dig into the metal surfaces of the parts when removing O-rings from the O-ring grooves. Scratching the sealing surface can result in a leak. If necessary, dig into the O-ring, and replace it during reassembly. If the sealing surface becomes damaged, use a 600-grit wet sand paper strip to smooth the surface, and then clean it

Note: New seals supplied in spare parts kits are not lubricated. They should be lightly coated with lubrication grease (Dow Corning 111 [DC 111] grease or equivalent lubricant) before they are installed into the equipment. This helps with the installation of the seals while reducing the risk of damage when positioning them on the parts. After the seals are installed, some additional lubrication can be applied to the probe or cylinder inner diameters to allow smooth transition of parts.

4. On the piston remove and replace the O-ring (Part 3) and two back-ups (Part 9). Make sure you position the O-ring in between the two back-ups.
5. Inside the top part of the base cap replace the O-ring (Part 2) and two back-ups (Part 6). Make sure you position the O-ring in between the two back-ups.
6. Then replace the O-ring (Part 3) on the outside of the top part of the base.
7. On the outside of the bottom part of the top cap, replace the snap ring (Part 12) and the O-ring (Part 3).
8. Inside the bottom part of the top cap, remove and examine the bearing (Part 13). If there are excessive scratches or tears, replace it.
9. Inside the top part of the top cap remove and replace the O-ring (Part 2) and two back-ups (Part 6). Make sure you position the O-ring in between the two back-ups.

3.4 ADDING OIL TO THE OIL POT

The unit is shipped from the factory with the necessary oil volume. If oil is needed, remove Valve D and add oil until the pot is ¾ full then replace Valve D.

CAUTION! If you are adding oil while the unit is still assembled and attached to a pipeline, depressurize the assembly, making sure Valve B is closed before removing Valve D.

Note: Under normal operating conditions, oil should not need to be added. If the unit is low on oil it is probably due to a leak.

MAINTENANCE

3.5 REASSEMBLY

1. **1.** Coat the inside-bottom end of the cylinder with Dow 111. Secure the base cap or flange (Part 1) onto the cylinder.
2. **2.** Coat the inside-top end of the cylinder with Dow 111.
3. **3.** Reinsert the probe into the base cap and cylinder approximately halfway.
4. **4.** Screw the eight long tie bolts into the base cap (or flanged lubrication body).
5. **5.** Slide the top cap onto the probe (Part 5) and then down into the cylinder aligning the tie bolts properly so that the tie bolts go through the top cap.
6. **6.** Reposition four hex nuts (Part 16) and four alignment nuts (Part 14) and tighten to the correct torque using a cross bolting sequence.

Torque Specifications for Tie Bolts		
Diameter of Tie Bolt	**Foot Pounds**	**KG/M**
$^{3}/_{8}$”	5-6	.69-.82
$^{1}/_{2}$”	15-20	2.07-2.76
$^{5}/_{8}$”	23-30	3.45-4.14
$^{7}/_{8}$”or 1”	55-65	7.60-8.98

7. **7.** Slide the lock collar back onto the probe, aligning the four holes with the alignment nuts (Part 14). Loosely replace the four lock collar hex cap screws (Part 15).
8. **8.** Connect the tubing on Valve A to Valve B, and from Valve C1 to Valve C2.
9. **9.** Repeat Section 2.3 steps 1 through 11 for reinstallation.

TROUBLESHOOTING

4. Troubleshooting Guide

The following is a troubleshooting table of issues most commonly associated with the Welker® Automatic Insertion Probes & Siphon models. If you are having a problem that is not listed, or if the solution provided does not repair the problem, please call Welker for service options.

PROBLEM ➡	POSSIBLE CAUSE ➡	SOLUTION
The probe doesn't insert or retract smoothly.	Air may be trapped in the oil pot, or the pot may need oil.	Check to make sure the oil pot is ¾ full; vent any air trapped in the pot. *See step four in section 3.3.* *See step four in section 2.5.*
The oil pot needs to be refilled often.	Oil may be leaking past the piston seal.	Replace the piston seal, and reassemble the probe. *See step 3 in section 3.3.* *See section 3.2 and 3.4.*
Pipeline or process pressure is leaking from the base cap's vent hole.	Seals in the base cap are leaking.	Replace the seals. *See step 3 in section 3.3.* *See Figure 14.*
The probe will not retract from the pipeline.	• There may not be enough pressure in the pipeline to eject the probe. • The probe is bent inside the pipeline, possibly due to pipeline velocity or the isolation valve closing on the probe while the probe is still inserted in the pipeline.	• Gently pull up on the probe until it begins to retract. • The unit will need to be repaired or replaced. Call Welker for service options.

APPENDIX A

Technical Information Regarding Corrosion Testing

An Article by A.S. Krisher

The views expressed in this article are those of the author(s) and do not necessarily reflect the official policy, position, or opinions of Welker. Welker has not researched the following information, and does not guarantee its accuracy.

APPENDIX A

Technical Information Regarding Corrosion Testing - By A. S. Krisher

Corrosion Testing, Why?
Corrosion tests are conducted for a number of reasons, some of which are:

1. To provide an insight into corrosion mechanisms.
2. To compare resistance of one alloy to another under standard conditions (in alloy development work for example).
3. As a quality control test for a given heat of alloy.
4. To provide a basis for estimating service life of process equipment.

The discussion which follows relates primarily to reason # 4, although the same principles apply in tests conducted for other reasons.

General Requirements for Coupon Tests
There are a number of "good practice" requirements which apply to all coupon testing.

1. The chemistry and processing history of the material in the coupon must be known.

2. The coupon must be positively identified, usually by code numbers stenciled into the specimen.

3. Data about the specific coupon test should be recorded in a permanent log book. Items which must be recorded are detailed information on the coupon (chemistry, mechanical properties, and processing history), dimensions of the coupon, initial weight of the coupon, and initial surface condition. Location, condition of exposure, and time of exposure must also be recorded.

Type of Tests
Data of value in estimating the probable service life of a piece of process equipment can be generated in a number of ways.

1. Operating Experience - The most reliable information is generated by actual operating experience with equipment in identical service. In a sense the equipment is being used as a large, complex, expensive coupon. This is a costly and slow testing method, especially when data on several materials is needed.

2. Model Equipment - Model equipment installed parallel with actual equipment or in a small scale (pilot plant) operation can generate information almost as reliable as full scale equipment. Care must be exercised to assure that important variables are adequately simulated.

3. Coupons - Field - Coupons exposed in operating equipment are widely used. Care must be taken to install the coupons so that they are exposed to the corrosive conditions of interest.

4. Coupons - Laboratory - Coupons exposed to laboratory solutions from plant operations, or less reliable synthetic solutions which approximate the chemistry of plant streams, generate useful information if the tests are properly designed and conducted. Such tests allow study of the affect of changes in process chemistry on corrosion.

5. Instrumental Test Methods - Advanced methods, including electrical resistance and linear polarization scans, are valuable additions to corrosion testing methods. They can generate a continuous record of corrosion rate. They also can be used to gain insight into corrosion mechanisms. The precautions noted with regard to coupon tests also apply with these methods.

Surface Condition of Coupons
Surface condition for coupons is a subject of substantial debate. A typical vessel as installed in the plant will have large surface areas in original mill condition, smaller areas of weld heat-affected zone, and areas that have been ground during the fabrication process. It is possible to replicate all of these conditions on a coupon. However, in the interest of simplicity and consistency, it is fairly common to machine the coupon surface flat, leaving a standard ground surface as defined by the size grading of the grinding media. An example would be the "120 grit finish" achieved by grinding with a 120 grit belt. This leaves a flat surface with clearly detectable scratches, all in a consistent direction. Any deviation from this standard initial surface is attributable to the exposure in the environment. Any effect on corrosion due to the initial finish, or the as welded heat-affected zone finish, or the ground surface will be very temporary in a corrosive system.

It is also worth noting that if the surface condition (i.e., the mill finish) does provide an improved corrosion resistance over the metal without this surface condition, such a situation will have questionable reliability in an operating system. When this surface condition is damaged mechanically or chemically, the corrosion resistance will revert to that of the parent metal without the special surface treatment.

Coupon Mounting
Coupons should be mounted in such a way that they are securely held and are electrically isolated from contact with all other metals (except when the purpose of the test is to study galvanic corrosion). Mounting materials (brackets, bolts, etc.) and insulating materials should be selected to be fully resistant to the environment. Failure of any of these components will lead to loss of data or loss of electrical isolation.

APPENDIX A

Time of Test

In general, coupon tests should be run for a minimum of 1 week. In many cases, it will be worthwhile and desirable to evaluate the effect of time of exposure which can be done by means of a controlled interval test.

Economics of Corrosion Testing

Corrosion testing is not cheap. More specifically, materials for a field rack with ten coupons will cost about $150 with 316 hardware or $250 with Hastelloy C-276 hardware. If a field test program required ten such racks, the total cost would be $1500 to $2500 plus the direct costs (rack assembly, rack installation and removal, record keeping, evaluation, reporting, etc.) These costs should be evaluated in terms of the benefits derived from the information generated by the tests.

In today's process industry, direct maintenance costs associated with a premature corrosion failure usually run to (at least) tens of thousands of dollars, and frequently into the hundreds of thousands. The business losses associated with such failures can easily be ten times the direct maintenance costs.

Considered in this fashion, it seems evident that the expenses of corrosion coupon testing can be easily justified.

Coupon Evaluation after Exposure

At the end of the test, observations of the coupon before cleaning should be recorded (photographically if appropriate). Samples are cleaned by various means (detailed in appropriate specifications) to remove all deposits and corrosion products from the unreacted metal. After cleaning, the coupon is weighed again and the corrosion rate is calculated from the weight loss.

$$\text{Corrosion Rate (CR)} = \frac{\text{Weight loss (g)} \cdot K}{\text{Alloy Density (g/cm}^3) \cdot \text{Exposed Area (A)} \cdot \text{Exposure Time (hr)}}$$

The constant can be varied to calculate the corrosion rate in various units:

Desired Corrosion Rate Unit (CR)	Area Unit (A)	K-Factor
mils/year (mpy)	in^2	5.34×10^5
mils/year (mpy)	cm^2	3.45×10^6
millimeters/year (mmy)	cm^2	8.75×10^4

$$\text{Metal Loss (ML)} = \frac{\text{Weight loss (g)} \cdot K}{\text{Alloy Density (g/cm}^3) \cdot \text{Exposed Area (A)}}$$

Desired Metal Loss Unit (ML)	Area Unit (A)	K-Factor
mils	in^2	61.02
mils	cm^2	393.7
millimeters	cm^2	10.0

Note that this calculation yields an average rate, assuming perfectly even metal loss from all surfaces. Examine coupons under low power magnification and record evidence of localized attack. End grain attack, localized weld attack, intergranular corrosion, accelerated attack in stressed area (at the stenciled numbers), and localized attack associated with the mounting hardware should be noted if present. The depth of penetration of localized attack should be determined by means of microscopic examination or metallographic examination.

Advantages of Coupon Testing

Coupon tests are low in cost, simple to conduct, and allow the simultaneous evaluation of numerous materials and variations of a single material. Alloy chemistry variations and metallurgical variations (ie., the effect of heat treatment, microstructure, welding and stress) can be considered. Coupon tests are easily adapted to evaluate specific types of corrosion, such as crevice corrosion and galvanic corrosion.

Summary

Coupon testing remains a powerful tool in the corrosion engineer's tool kit. Intelligent and systematic use of this tool provides data which allows a knowledgeable and experienced engineer to make reliable predictions of field performance.

To Dig Deeper

There is a large body of literature dealing with corrosion coupon testing. The references listed below will serve as a useful introduction.

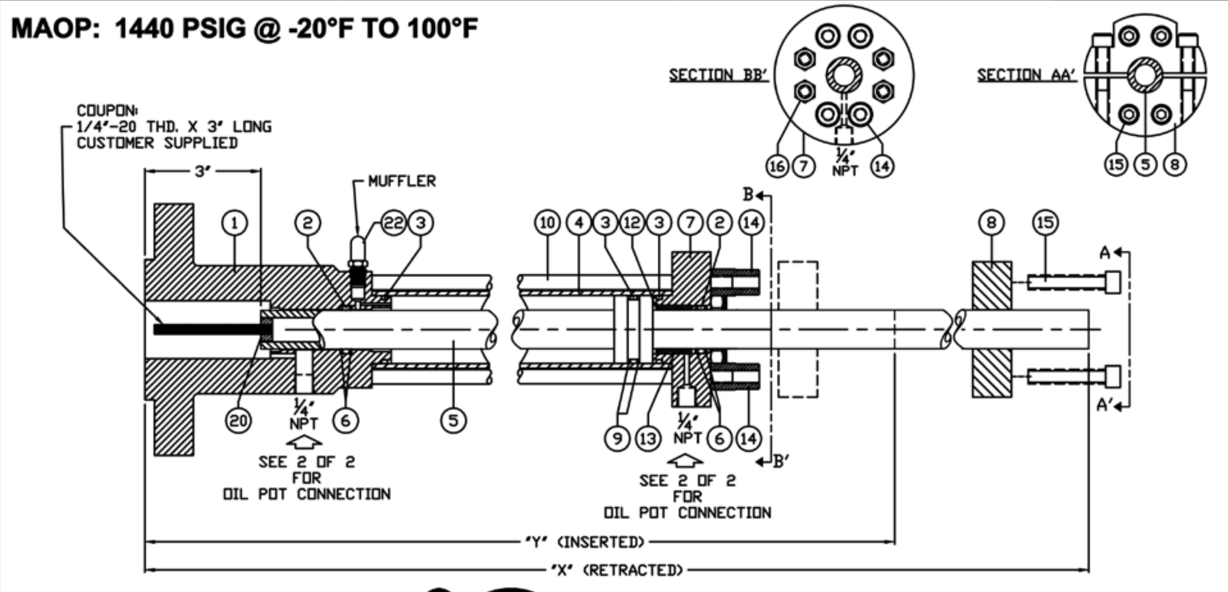
1. Ailor, W.H. Ed. Handbook on Corrosion Testing and Evaluation J. Wiley, 1971.
2. ASTM G1-81, "Preparing, Cleaning, and Evaluating Corrosion Test Specimens." *
3. ASTM G4-84, "Conducting Corrosion Coupon Tests in Plant Equipment." *
4. ASTM G-30.
5. ASTM G31-72, "Laboratory Immersion Corrosion Testing of Metals." *
6. ASTM G46-76, "Examination and Evaluation of Pitting Corrosion." *
7. ASTM G-58.
8. ASTM G78-83, "Crevice Corrosion Testing of Iron-Base and Nickel-Base Stainless Alloys in Seawater and Other Chloride Containing Aqueous Environments."

* American Society for Testing and Materials, Philadelphia, PA.

APPENDIX B

MATERIAL: 316 S.S. | FINISH: N/A | TO PROTECT SENSITIVE PIPELINE EQUIPMENT, WELKER INC RECOMMENDS INSTALLING ANY PRODUCT PROTRUDING INTO THE PIPELINE UPSTREAM OF THE STRAINER. | DRAWING NUMBER: AD784CS | REV: -

MAOP: 1440 PSIG @ -20°F TO 100°F



DATE	REV.	RECORD	AUTHORIZED	DRAFTER	CHECKED
6/18/10	-	DR# 8815	TDP	MC	JL

WELKER

13839 WEST BELLFORT
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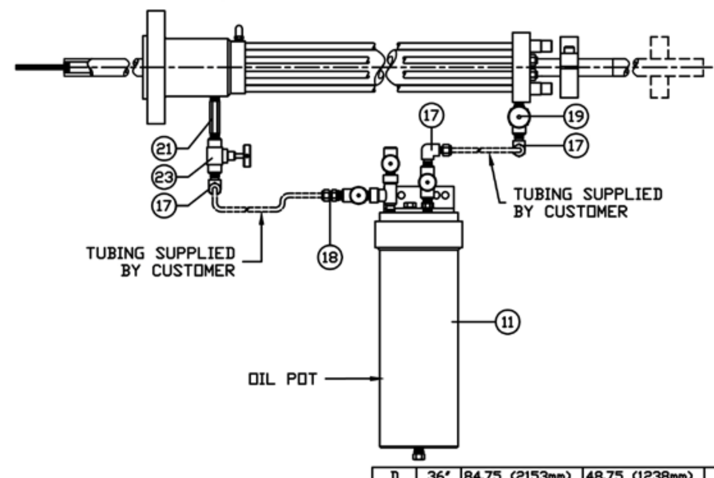
FAX (281) 491-8344

TITLE: AUTOMATIC INSERTION DEVICE
STYLE": AID-1cc w/1" PROBE SHAFT
2"-600RF SOLID 316 S.S.

DRAWN BY: MC | SCALE: STF | APPROVED BY: | DRAWING NUMBER: AD784CS
DATE: 6/18/2010 | SHEET: 1 of 2 | REV: -

MATERIAL: 316 S.S. | FINISH: N/A | TO PROTECT SENSITIVE PIPELINE EQUIPMENT, WELKER INC RECOMMENDS INSTALLING ANY PRODUCT PROTRUDING INTO THE PIPELINE UPSTREAM OF THE STRAINER. | DRAWING NUMBER: AD784CS | REV: -

MAOP: 1440 PSIG @ -20°F TO 100°F



D	36"	84.75 (2153mm)	48.75 (1238mm)	OFP1HP
B	24"	60.75 (1543mm)	36.75 (937mm)	OFP1HP
A	18"	48.75 (1238mm)	30.75 (781mm)	AIP2027
INSERTION		"X"	"Y"	(11) OIL POT

NO.	REQ.	DESCRIPTION	PART NO.
23	1	VALVE, 1/4" F/F	NV1FF
22	1	MUFFLER, 1/8" NPT BRONZE	MF2460B
21	1	HEX LONG NIPPLE, 1/4" X 3" OAL	MF3513X
20	1	ISOLATION BUSHING	AID1340
19	1	VALVE, 1/4" M/F	NV1MF
18	1	MALE CONNECTOR 1/4"T X 1/4" NPT	MF0180X
17	3	MALE ELBOW 1/4"T X 1/4" NPT	MF0900X
16	4	HEX NUT, 3/8"-16 S.S.	MA005OX
15	4	HEX SOCK CAP SCR 3/8"-16 X 2" S.S.	MA006JX
14	4	ALIGNMENT NUT	LSM3022
13	1	BEARING, TOP FLANGE	AIPP7027
12	1	SNAP RING	RR0541X
11	1	OIL POT	SEE TABLE
10	8	TIE BOLT	AID1027[]
9	2	BACK-UP, SPIRAL	BU214SP
8	1	LOCK DOWN COLLAR	AID1093
7	1	END CAP	AID1092
6	4	BACK-UP, SPIRAL	BU222SP
5	1	SHAFT S.A.	AID1338[][]
4	1	CYLINDER	AID1026[]
3	3	O-RING, VITON	VO70222
2	2	O-RING, VITON	VO70214
1	1	LUBRICATOR , 2"-600RF 316 S.S.	AID1361X

DATE	REV.	RECORD	AUTHORIZED	DRAFTER	CHECKED
6/18/10	-	DR# 8815	TDP	MC	JL

WELKER

13839 WEST BELLFORT
SUGAR LAND, TEXAS 77498-1671
PHONE (281) 491-2331
FAX (281) 491-8344

TITLE: AUTOMATIC INSERTION DEVICE
STYLE": AID-1cc w/1" PROBE SHAFT
2"-600RF SOLID 316 S.S.

DRAWN BY: MC | SCALE: STF | APPROVED BY: | DRAWING NUMBER: AD784CS
DATE: 6/18/2010 | SHEET: 2 of 2 | REV: -

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