220. When installing or removing a coupon, you must make sure not to touch the coupon with your hands or you may _____ the results.

221 Also, do *NOT* scrape or wash the coupon. Whatever is on the coupon needs to be analyzed to determine the cause or type of _____ .

222. Once again, it is very important to label the protective container with the coupon. Include such information as:

the _____ in which the coupon was used,

the type of service and _____ ,

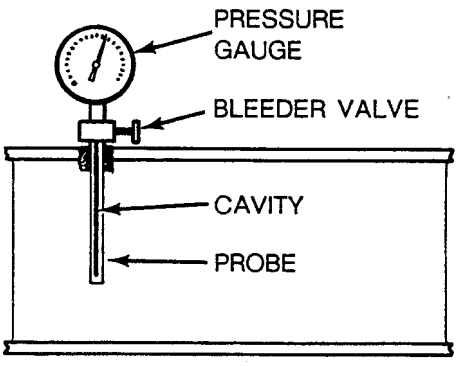
the dates it was _____ and _____ .

CORROSION RATE COMPARISONS USING PROBES AND OTHER TEST EQ

223. One important point to remember in handling any probes: if you remove a probe for any reason, make sure you replace it _____ .

Hydrogen Probes

224. One type of probe is the hydrogen pressure probe. The probe is a hollow steel tube with one end capped and the other end attached to a pressure gauge.



HYDROGEN PROBE

As corrosion occurs on the exterior of the probe, hydrogen that is formed enters the _____ in the probe.

225. As more hydrogen enters the cavity, the _____ builds up.

226. By monitoring pressure change in relation to any corrosion control measures that are being taken, you (can / cannot) tell if the measures are effective.

227. As hydrogen pressure continues to build, it may become necessary to let some of the hydrogen escape. You can do this by opening the _____ _____ .

ANSWER MASK

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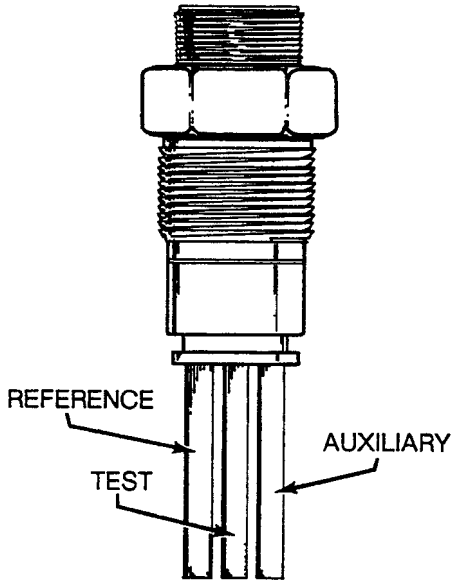
228. However, some pressure should remain in the probe as a check against leaks. If you left 10 psi in the probe and the next time you checked the pressure had dropped, you would assume there is a _____ in the probe, or you didn't _____ the bleeder valve completely.

229. Hydrogen pressure probes are best suited for use in testing "sour" systems. You would expect to find them in systems containing some (hydrogen sulfide / carbon dioxide).

POLARIZATION PROBE

230. Another type of probe is a polarization probe. It works a bit differently than a hydrogen probe.



POLARIZATION PROBE

In the polarization probe, an electric current is applied between the test and auxiliary electrodes to reach a specified degree of polarization.

The corrosion rate is directly proportional to the amount of current required to create this degree of polarization.

That is, as the current that is required gets higher, the corrosion rate gets (higher / lower).

231. If the corrosion rate is low, the amount of current required will be _____ .

232. Readings on polarization probe meters are set to be direct. There is no need for _____ .

NOW TURN THE PAGE, TURN THE BOOK OVER AND GO ON.

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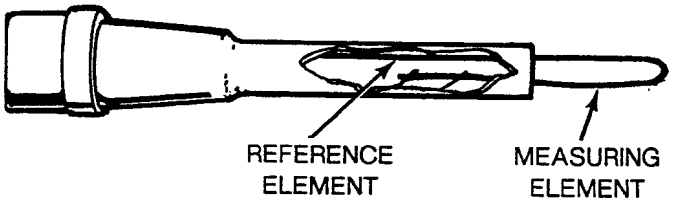
233. Unlike other probes that provide relative corrosion rates over a period of time, polarization probes provide corrosion rates at a specific point in time.

Because they reflect corrosion rates differently, rates determined by different monitoring systems (can / cannot) always be directly compared.

ELECTRICAL RESISTANCE PROBE

234. Another type of probe is the electrical resistance probe.

ELECTRICAL RESISTANCE PROBE



As the name implies, it measures _____ _____ .

235. Resistivity is the opposite of conductivity; it is the inability to conduct electricity.

So, if a resistance level is high, it means that there is (a lot of / little) electricity flowing.

236. In the probe there are two wires.

The probe measures _____ in each wire.

237. However, only one of the wires is exposed to the _____ environment.

238. As a metal wire gets thinner its ability to conduct electricity gets lower, meaning its resistance gets _____ .

239. If the resistance in both wires was the same, but now resistance in the exposed wire increased, corrosion (has / has not) taken place on the exposed wire.

240. It is safe then to assume that the environment is _____ .

241. By monitoring the amount of change in the resistance, you (can / cannot) tell if the corrosiveness is more or less severe now than previously.

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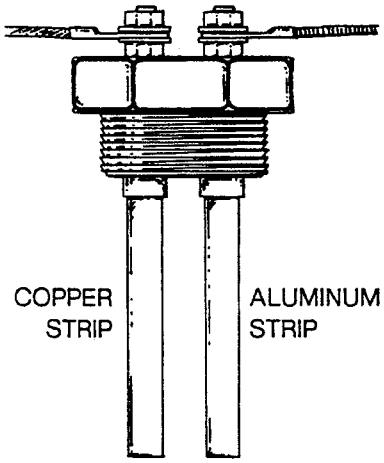
ANSWER MASK

GALVANIC PROBE

242. There are also galvanic probes.



GALVANIC PROBE

This probe has (one / two) types of metals.

243. As with the resistance probe, a galvanic probe also measures the amount of change in the _____ _____ flowing.

244. Since galvanic probes can sense changes in electric current as they occur, they are often used to detect sudden changes.

This makes them useful in setting off _____ .

OTHER TESTING METHODS

245. Another monitoring device uses ultrasonic measurements.

As you recall, metal thinning indicates the presence of _____ .

246. Variations in the time sound waves travel through metal will indicate a change in the metal's (resistance / thickness).

247. Another device used to detect metal deterioration functions like devices used to detect broken bones. This device uses _____ .

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ANSWER MASK

248. Both the ultrasonic and x-ray equipment are used most often to detect corrosion in areas of high fluid velocity and turbulence. You would likely see these devices used on (pipe ells and bends / settling tanks).

SUMMARY

249. Once a problem has been detected, the problem needs to be defined in order to control it.

Taking an iron count or water sample can tell you (only a problem exists / exact location of the problem).

250. Also, you will need to know how quickly the problem is increasing. So, (one test / numerous tests) should be performed.

251. This can give an indication as to the rate of corrosion by comparing the results of consecutive _____ .

252. It is also helpful to monitor other nearby areas within the system to see if the problem is just in one area or throughout the _____ .

253. Failure reports and records of the results found by monitoring can be extremely helpful.

If you find that corrosion keeps occurring in the same location, you would know that further investigations are needed to solve or _____ the situation.

254. If the reported results shows some sudden changes, you should check to see if any of the operating conditions have changed. As you recall, changes in temperature, pressure and velocity (affect / do not affect) the corrosion rate.

255. Also, if you happen to notice any changes in operating conditions, it is important to report it. This is to avoid the possible injuries or equipment _____ that may arise due to the change.

256. If the reports indicate a trend or pattern, you should be able to _____ the possibility of future damage.

257. With this information, you can treat corrosion before it causes extensive_____ .

258. These reports can also give an indication as to the effectiveness of a treatment program.

If you notice, by your report, that the rate of corrosion is decreasing, you know that the treatment is (successful / not successful).

259. But, on the other hand, reports can be misleading or _____ .

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