## HLWYM HEmails

**From:** Darrell Dunn [darrell.dunn@swri.org]
**Sent:** Friday, August 12, 2005 10:54 AM
**To:** Xihua He
**Subject:** RE: definition of repassivation potential

I was thinking that you could run a CPP scan (ASTM G61) with a well characterized material like 316L. In 0.5 M Cl, crevice corrosion would easily be observed especially if the temperature was 60 C or higher. If you run a test with a Teflon washer, you have a typical test result and you can determine the repassivation potential using either a current density criteria or look a the crossover (where the reverse scan intersects the forward scan). If you then run a test with the Ti washer/crevice former (or another material), you can compare the results to the test with the Teflon washer. Of course the value of the repassivation potential using a current density criteria will be dependent on what you define as the area of the specimen. However, the crossover potential will not be dependent on what you define as the area. This would allow you to compare a repassivation potential value that is dependent on a current density criteria to a repassivation potential that is not dependent on the sample area.

I hope this all makes sense. If not let me know. We can talk either by phone or meet over in Bldg 57.

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**From:** Xihua He [mailto:xhe@cnwra.swri.edu]
**Sent:** Friday, August 12, 2005 8:46 AM
**To:** darrell.dunn@swri.org
**Subject:** RE: definition of repassivation potential

It seems that using the entire surface area is more reasonable. For one test with Alloy 22 coupled to Ti7, after polarization to measure the repassivation potential, it didn' show crevice corrosion. The repasivation potential is 382 mVSCE if we use the area of crevice specimen only, but the repassivation potential is 550 mVSCE which is the hold potential if we use entire surface area.

Would you clarify a little bit more for the screeening tests you mentioned?

Thanks,
Xihua

> -----Original Message-----
> **From:** Darrell Dunn [mailto:darrell.dunn@swri.org]
> **Sent:** Friday, August 12, 2005 8:20 AM
> **To:** xhe@cnwra.swri.edu
> **Subject:** RE: definition of repassivation potential
>
> I would determine the repassivation potential two ways and compare the results. Your suggestion of using the entire surface area is logical. I would be interesting to compare to the value obtained using only the specimen surface area.

Another possibility is to run a CPP scan with a Teflon washer and with the Ti washer and see how the crossover point varies. You may want to pick a more susceptible material like 316L in 0.5 M Cl to do some screening tests first.

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**From:** Xihua He [mailto:xhe@cnwra.swri.edu]
**Sent:** Thursday, August 11, 2005 4:29 PM
**To:** darrell.dunn@swri.org
**Subject:** definition of repassivation potential

Darrell,

I am analyzing the data from Al's tests. I have one question to ask you regarding the repassivation potential. In our previous reports, the crevice corrosion repassivation potential is defined as the potential where the current density remains below 2*10-6 A/cm2. In those tests we used Teflon as crevice washer. The crevice specimen was insulated from the bolt and nut. So we only took the crevice specimen area (20 cm2) into account. For Al's dissimilar metal crevice tests, the crevice specimen has electrical contact with cathode, bolt, and nut. I think we should take into account the entire area to calculate the current density, instead of using the area of the crevice specimen only. The surface area will make difference to the current density, so to the repassivation potential. Do you agree?

Thanks,
Xihua

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**Created By:** darrell.dunn@swri.org

**Recipients:**
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