Corrosion Test 3/1/11

Vessel Information: _____
Materials: Hull _____ Shaft _____ Propeller _____ Outdrive _____
Shore Power Service: _____ Volts/Amps, GI? Yes / No, Transformer? Yes / No (Iso. or Polar.)
Cathodic Protection (anode type, size, location, condition): _____
Installed Monitor System (type, condition, indications): _____
Water current (motion) at the boat: _____, Conductivity _____

Tests At Pedestal (shore cords disconnected, main boat AC breaker on, any 2-pole branch breakers on)

1. Test-zinc potential: _____ 2. Dock gnd potential at pedestal: _____

3. Vessel hull (ground) potential: _____(cord 1), _____(cord 2)
   (will have to do this on the boat if isolators installed)

4. Shore cord ground current: _____ ma (cord 1), running off / on vessel (circle one)
   _____ ma (cord 2), running off / on vessel (circle one)

5. TV cable sheath current: _____ , running off / on vessel (circle one)

6. Neu – Gnd resistance: _____ohm (cord 1), _____ohm (cord 2) (spec: >25kohm)
   (will have to do this on the boat if isolators installed)

7. Gnd – Gnd resistance (if multiple cords): _____ohm (spec: 1ohm or less)
   (note: could be 0L or open circuit if galvanic isolators installed depending on how installed)

8. Neu – Neu resistance (if multiple cords): _____ohm (spec: 0L or open circuit)

Tests On Vessel (DC breakers off, AC main breaker on)
Shore cord connected:
1. Engine block potential (port): _____(stbd): _____
2. Move ref cell to other beam. Eng block potential: _____ (large change means in a DC field)
3. Shaft potential: _____(port), _____(stbd)

Shore cord disconnected (to ensure the dock does not cause changes during the bonding testing):
1. Engine block potential (port): _____(engine off), _____(engine running)
   (stbd): _____(engine off), _____(engine running)
   Using voltmeter: Voltage potential between engine blocks: _____(engines running)
   (spec: should be near zero if bonding is proper)

2. Genset block potential: _____(genset off), _____(genset running)

3. Shaft potential: _____(port), _____(stbd)

4. Check potential of all underwater metals and bonded equipment, and record. Check as many accessible parts of a stern drive or outboard as practical. Recheck engine block potential: _____.

5. Monitor hull potential while momentarily energizing DC loads to test for stray currents.
   Record all potentials during this test. Rapid shift means item could be a stray corrosion current source.

6. Engine block to bonding system resistance: _____ohm (spec: 1 ohm or less)

7. AC grounding to bonding system resistance: _____ohm (spec: 1 ohm or less)

AC Leakage Test:

1. Pedestal breaker off. Shore cord attached.
2. Measure whole cord current with AC clamp meter: _____amps (any current measured is coming from a source other than the boat under test). If current is varying, use averages for this testing.
3. Turn pedestal breaker on. Energize AC loads as practical. Measure whole cord current with AC clamp meter: _____amps (any current measured is current going into the water from faults on boat under test). If water path current increases with each load, there is likely a grounded neutral on the boat under test.

Note: If 2 cords, clamp together, or each one individually and take difference. If "Y" used, clamp combined cord.

4. Net water leakage caused by boat under test (3 minus 2) _____amps (spec: <100ma freshwater, <500ma salt/brackish)
5. Measure and record current in the green ground wire: _____amps. (split cord is convenient tool)
6. Net fault current leakage from boat under test in green ground wire (5 minus 2) _____amps. (spec: <500ma)
7. Total leakage all loads: Sum of 4 and 6: _____amps (spec: <500ma)
8. Optional: Secure loads one at a time, as necessary to determine source of any leakage current measured.
9. If the total water path is <3amp, the chance of corrosion to aluminum is small (assumes a sterndrive with approx. 90% of coating intact)

Suretest Impedances: Hot_____ohms, Neutral_____ohms, Ground_____ohms, VD_____%
Spec: Ground 1.0 ohm or less, Voltage Drop 10% or less.

Galvanic Isolator Test: (shore cord must be removed, or one end of isolator disconnected)

1. Bring shore end of shore cable aboard boat.
2. Put meter on the diode check scale.
3. Connect meter to ground lug on the cable and good boat ground.
4. The meter reading should slowly rise to approx. 0.8-1.1 volts DC. Reverse the leads and repeat.
   Forward direction: _____ volts, Reverse direction: _____ volts

(Spec: any readings other than described in 4 above mean the GI is defective)
(Note: the absence of a capacitor means any AC grounding wire current can cause the diodes to conduct).

Bonding Continuity Test (requires boat to be out of water)

1. Measure resistance between anodes and protected components. This should include outdrive components as applicable. (spec: 1 ohm or less). Record any out-of-spec readings.

Other Items to Observe

1. Check fuel tank installation to the extent practical. Tank material:_____
Comments:

2. Check plumbing connections on raw water systems for compatible materials.
Comments:

3. On metal boats check all areas for corrosion and coating. Ideally there should be a single connection from the bonding system to the hull. Look for ground return wires hooked to the hull or structures attached to the hull.
Comments:

4. Check chainplate and rigging hardware for signs of corrosion. Look at condition of caulking material used to seal openings where chainplates penetrate boat structures.
Comments:

Fiberglass -750 to –1100 (note the lower number is more conservative than E-2)
Wood -550 to –600
Aluminum -900 to –1100 (note E-2 uses -950 as the low end, recent change)
Steel -850 to –1100
Non-metallic w/Aluminum Drives -900 to -1100 (note E-2 uses -950 as the low end, recent change)