CLAIMS

1. A high pressure, high temperature dynamic multi-phase testing system for testing corrosive and corrosive-erosive environments by providing a test fluid mixture that is at a different phase at different locations within the system comprising:

a casing defining an inner section;

a plurality of spacer rings disposed vertically relative to one another and supported by the casing and adapted to support a plurality of ring shaped test coupons, including at least ~~a~~ first, second, and third ring-shaped test coupons, in which the first, second, and third ring-shaped test coupons are disposed at a respective an upper section, middle section, and lower section of the casing; and

a plurality of separator plates, in which one of the plurality of separator plates is disposed between the upper and middle section of the casing and another of the plurality of the separator plates is disposed between the middle and lower section of the casing,

in which the separator plates are configured to maintain a separation between each of the phases of the multi-phase test fluids so that each of the ring-shaped test coupons is exposed to a different phase or combination of phases of the test fluids.

2. A test system according to Claim 1, further comprising a rotor shaft disposed within the casing and arranged to turn within the test fluids.

3. A test system according to Claim 2, further comprising first and second impellers supported by the rotor shaft and positioned to stir the test fluids within the casing.

4. A test system according to Claim 3, in which one of the first and second impellers is disposed at the lower section of the casing to stir one phase of the test fluids, and in which the other of the first and second impellers is disposed at the middle section of the casing to stir another phase of the test fluids.

5. A test system according to Claim 3, further comprising baffles supported by the casing and extending into the fluid, in which the baffles are shaped and arranged to reduce vortex formation in the fluid within the casing.

6. A test system according to Claim 1, further comprising particulate matter disposed within the test fluid to simulate additional corrosion and corrosion-erosion conditions.

7. A test system according to Claim 1, further comprising a first particulate matter disposed within one phase of the test fluid and second particulate matter disposed within another phase of the test fluid.

8. A test system according to Claim 7, in which the first particulate matter is sand and the second particulate matter is sulfur.

9. A test system according to Claim 7, in which the separator plates are positioned to restrict migration of the first and second particulate matter from migrating between respective sections of the casing.

10. A method of performing high pressure, high temperature dynamic multi-phase testing system for testing corrosive and corrosive-erosive environments in a test vessel, comprising the steps of:

preparing a test system, the test system including:

a plurality of ring-shaped test coupons;

a casing defining an inner section;

a plurality of spacer rings disposed vertically relative to one another and supported by the casing;

in which at least a first, second, and third ring-shaped test coupons among the plurality of ring-shaped test coupons are each disposed between at least two of the plurality of spacer rings, in which the first, second, and third ring-shaped test coupons are disposed at a respective an upper section, middle section, and lower section of the casing; and

a plurality of separator plates, in which one of the plurality of separator plates is disposed between the upper and middle section of the casing and another of the plurality of the separator plates is disposed between the middle and lower section of the casing,

providing a test fluid mixture that is at a different phase at different locations within the system and which is in surrounding relation to the plurality of ring-shaped test coupons, in which the separator plates are configured to maintain a separation between each of the

phases of the multi-phase test fluids so that each of the ring-shaped test coupons is exposed to a different phase or combination of phases of the test fluids;

maintaining, for a period of time, a temperature and a pressure within the test vessel; and

inspecting the plurality of ring-shaped test coupons for corrosive and corrosive-erosive effects.

11. A method of performing high pressure, high temperature dynamic multi-phase testing system for testing corrosive and corrosive-erosive environments in a test vessel according to Claim 10, in which the temperature is maintained between 250°F and 500°F.

12. A method of performing high pressure, high temperature dynamic multi-phase testing system for testing corrosive and corrosive-erosive environments in a test vessel according to Claim 10, in which the pressure is maintained between 5000 psi to 10000 psi.

13. A method of performing high pressure, high temperature dynamic multi-phase testing system for testing corrosive and corrosive-erosive environments in a test vessel according to Claim 10, in which the temperature is maintained between 250°F and 500°F and in which the pressure is maintained between 5000 psi to 10000 psi.

14. A test system according to Claim 1, in which one of the separator plates is configured to restrict migration of particulate matter from the lower section to the middle section of the casing.

15. A test system according to Claim 1, in which one of the separator plates is configured to restrict migration of particulate matter from the upper section to the middle section of the casing.