

|                                                                                  |                               |                       |                           |                           |                               |                      |
|----------------------------------------------------------------------------------|-------------------------------|-----------------------|---------------------------|---------------------------|-------------------------------|----------------------|
|  | PER CO #15650                 | Tech<br>RN            | Approved By<br>R.JAZOWSKI | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                  | Originator<br>BRIAN CORNELIUS | Checked By<br>W.MUDGE |                           | Page<br>1 of 39           | Reference<br>QTP-309-40       | Class<br>40          |

SUBJECT: **HIGH POWER NAUTILUS ELECTRICAL STEM ENGINEERING QUALIFICATION**

### TABLE OF CONTENTS

| <u>SECTION</u> | <u>TITLE</u>                                          | <u>PAGE</u> |
|----------------|-------------------------------------------------------|-------------|
| 1.0            | PURPOSE:.....                                         | 2           |
| 2.0            | MATERIALS NEEDED:.....                                | 2           |
| 3.0            | REFERENCE DOCUMENTS:.....                             | 3           |
| 4.0            | DOCUMENTATION:.....                                   | 4           |
| 5.0            | TEST PREPARATION:.....                                | 6           |
| 6.0            | PIN STRAIN TO FAILURE TEST PROCEDURE:.....            | 7           |
| 7.0            | PARTIAL DISCHARGE TEST PROCEDURE:.....                | 8           |
| 8.0            | HIGH PRESSURE SOAK TESTING:.....                      | 15          |
| 9.0            | POST PRESSURE TESTING PARTIAL DISCHARGE TESTING:..... | 26          |
| 10.0           | HIGH VOLTAGE DC BREAKDOWN TESTING:.....               | 29          |
| 11.0           | POST TESTING INSPECTION:.....                         | 37          |
| APPENDIX A:    | .....                                                 | 39          |

|                                                                               |                           |                               |                      |
|-------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                               | Page<br>2 of 39           | Reference<br>QTP-309-40       | Class<br>40          |

## 1.0 **PURPOSE:**

THE PURPOSE OF THIS PROCEDURE IS TO BEGIN QUALIFICATION OF THE HIGH POWER NAUTILUS ELECTRICAL STEMS. THE STEMS WILL BE QUALIFIED FOR PRESSURE AND VOLTAGE RATINGS, WHILE ENSURING PARTIAL DISCHARGE VALUES DO NOT EXCEED 10 pC. THIS QUALIFICATION ALSO PROVIDES A MEANS OF ACCURATELY CAPTURING STRAIN TO FAILURE DATA FROM A RAPID RAMP TEST AND TWO DIFFERENT DURATION LONG-TERM HOLDS AT DIFFERENT CONSTANT STRAIN VALUES, WHICH MAY LATER BE EXTRAPOLATED AND USED FOR PIN LIFE PREDICTION.

## 2.0 **MATERIALS NEEDED:**

- **D/N 161589** (HPR-244-04) HIGH POWER PLUG ELECTRICAL STEM DIAGRAM
- **D/N 75879** (SOP-085-39) DIGITAL IMAGE NAMING CONVENTION PROCEDURE
- **D/N 166319** (QTP-310-40) STRAIN TO FAILURE QUALIFICATION TEST PROCEDURE FOR HIGH POWER NAUTILUS PINS
- **D/N 165286** (HPR-207-41) HIGH POWER PLUG MODULE
- **D/N 110829** LOCKOUT/TAG OUT & KEY CONTROL PROCEDURE FOR HIGH VOLTAGE TESTING SAFETY
- **D/N 10637** (SOP-021-39) STANDARD PRACTICE FOR CONNECTOR TERMINATING
- **D/N 50166** (EHS.3-23) HIGH VOLTAGE TESTING SAFETY
- **D/N 110833** APG LAB HIGH-VOLTAGE SAFETY RULES
- **D/N 165233** (ATP-117-40) PARTIAL DISCHARGE TEST PROCEDURE FOR HIGH POWER COMPONENTS AND ASSEMBLIES
- **P/N 1050515** (HPR-248-01) PARTIAL DISCHARGE TEST FIXTURE
- **P/N 1049505** (HPR-207-01) 3-WAY HP PLUG MODULE
- **P/N 1050251** (HPR-237-04) HP PLUG BOOT SEALS
- **P/N 1049549** (HPR-221-04) RECEPTACLE MODULE BLADDER HP
- COTTON SWABS
- DC4 DOW CORNING DIELECTRIC LUBRICANT
- DC200/100CS SILICONE OIL
- DIGITAL CAMERA
- ELECTRICAL TESTING FACILITIES AND ASSOCIATED EQUIPMENT (AC FOR PARTIAL DISCHARGE PROCEDURE, DC FOR HIGH VOLTAGE BREAKDOWN PROCEDURE)
- ISOPROPYL ALCOHOL
- MEGOHM METER
- MICROSCOPE WITH CAMERA
- PARTIAL DISCHARGE TEST EQUIPMENT
- PRESSURE TESTING FACILITIES CAPABLE OF WITHSTANDING 20 KPSI
- PRESSURE VESSEL FIXTURE CAPABLE OF 20 KPSI DIFFERENTIAL PRESSURE

|                                                                                   |                               |                                   |                          |
|-----------------------------------------------------------------------------------|-------------------------------|-----------------------------------|--------------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br><br>1-29-08 | Document No.<br><br><b>166318</b> | Revision<br><br><b>A</b> |
|                                                                                   | Page<br><br>3 of 39           | Reference<br><br>QTP-309-40       | Class<br><br>40          |

### 3.0 REFERENCE DOCUMENTS:

- **D/N 38302** (IEC 60270) HIGH VOLTAGE TEST TECHNIQUES
- **D/N 135594** (ENG-727-20) HIGH POWER NAUTILUS CONNECTOR EPOXY  
PIN FAILURE INVESTIGATION SUMMARY  
REPORT

**CAUTION: THIS QUALIFICATION TESTING REQUIRES THE USE OF HIGH POWER ELECTRICAL EQUIPMENT. USE CAUTION TO PREVENT PERSONAL INJURY OR DEATH. ADVISE SUPERVISOR OR SAFETY COMMITTEE MEMBER OF ANY CONCERNS BEFORE STARTING TESTS. MAINTAIN SAFETY PRACTICES PER D/N 50166, D/N 110829, AND D/N 110833.**

**NOTE: DIGITAL PHOTOGRAPHS SHOULD BE TAKEN THROUGHOUT THE QUALIFICATION TESTING TO ASSIST IN DOCUMENTING THE SET-UP, ACTIONS AND RESULTS. THE MINIMUM REQUIRED PHOTOS ARE IDENTIFIED IN THE PROCEDURE.**

**NOTE: ALL ELECTRONIC DATA INCLUDING PHOTOGRAPHS, COMPUTER GATHERED DATA, ETC. SHOULD BE COPIED TO AN ELECTRONIC STORAGE DEVICE (DISK), LABELED AND INSERTED INTO THE APPROPRIATE SECTION SLEEVE WHEN THAT PARTICULAR SECTION IS COMPLETED.**

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>4 of 39           | Reference<br>QTP-309-40       | Class<br>40          |

#### 4.0 **DOCUMENTATION:**

**NOTE: IF FAILING READINGS ARE TAKEN OR ANY DAMAGE IS NOTED AT ANY TIME DURING TESTING, INITIATE A DISCREPANCY REPORT (DR), CONTACT ENGINEERING WITH THE DR NUMBER AND ATTACH A COPY OF THE DISPOSITIONED DR TO THE SHOP PACK FOR RETENTION.**

- 4.1 REVIEW THE QUALITY PLAN (IF PRESENT) TO DETERMINE ENGINEERING WITNESS AND HOLD POINTS. IF ENGINEERING WITNESS OR HOLD IS REQUIRED, ADVISE THE PROJECT ENGINEER OF THE ESTIMATED STARTING DATE VIA E-MAIL. ATTACH A COPY OF THE E-MAIL TO THIS DOCUMENT. ATTACH TEMPORARY MARKERS TO THIS PROCEDURE FOR ANY STEPS THAT HAVE BEEN IDENTIFIED AS HOLD POINTS. THESE STEPS ARE NOT TO BE PERFORMED WITHOUT ENGINEERING APPROVAL. OBTAIN A COPY OF THE QUALITY PLAN (IF PRESENT) AND ATTACH TO THIS TEST PROCEDURE.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 4.2 RECORD ALL OF THE INFORMATION REQUESTED BELOW FOR ALL OF THE EQUIPMENT, COMPONENTS AND DOCUMENTS USED IN THIS QUALIFICATION. INCLUDE ALL ASSEMBLY AND COMPONENT LEVEL DRAWINGS AND ATTACH ALL INSPECTION DOCUMENTS.

JOB NUMBER (IF APPLICABLE): \_\_\_\_\_

QUALITY PLAN DOCUMENT NUMBER (IF PRESENT): \_\_\_\_\_

PROJECT ENGINEER: \_\_\_\_\_

#### **DOCUMENTS**

| DOCUMENT NO. | REFERENCE NO. | DESCRIPTION | REVISION |
|--------------|---------------|-------------|----------|
| _____        | _____         | _____       | _____    |
| _____        | _____         | _____       | _____    |
| _____        | _____         | _____       | _____    |
| _____        | _____         | _____       | _____    |
| _____        | _____         | _____       | _____    |
| _____        | _____         | _____       | _____    |
| _____        | _____         | _____       | _____    |

TECHNICIANS (PRINT): \_\_\_\_\_ ; \_\_\_\_\_

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>5 of 39           | Reference<br>QTP-309-40       | Class<br>40          |

- 4.3 ATTACH ALL DOCUMENTS TO THIS TEST PROCEDURE, INCLUDING RELEVANT INFORMATION FROM THE LOWER LEVEL ASSEMBLIES FOR COMPLETENESS. ALSO, OBTAIN AND ATTACH A PRINTED COPY OF THE ASSEMBLY PARTS LIST AND RECORD THE REVISION OF EACH PART USED.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 4.4 QUALITY ENGINEERING TO ENSURE THIS SECTION IS COMPLETE, INCLUDING ALL TEST RESULTS, PHOTOGRAPHS AND REFERENCE INFORMATION. ENSURE ALL ARE LABELED AND ATTACHED. ALL ELECTRONIC DATA SHALL BE COPIED AND THE STORAGE DEVICE (DISK) SHALL BE APPROPRIATELY PLACED WITHIN THIS SECTION OF THE PROCEDURE.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

QUALITY ENGINEER: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>6 of 39           | Reference<br>QTP-309-40       | Class<br>40          |

## 5.0 TEST PREPARATION:

**NOTE: FAILURE TO COMPLETELY FILL OUT ALL PAPERWORK PERTAINING TO THE BUILD AND QUALIFICATION OF THIS UNIT WILL VOID THIS QUALIFICATION TEST.**

- 5.1 RECORD THE MATERIALS REQUISITION (MR) NUMBER(S) (IF APPLICABLE) ASSOCIATED WITH THE PROCUREMENT OF ANY PARTS REQUIRED FOR THIS TESTING.

MR NUMBER(S) : \_\_\_\_\_

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 5.2 IF NOT ALREADY DONE, OBTAIN ALL MATERIALS (I.E., PROCEDURES, DRAWINGS, PARTS, EQUIPMENT, TOOLS, ETC.) REQUIRED TO COMPLETE THE FOLLOWING TESTING.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 5.3 INSPECT THE PINS FOR SIGNS OF DAMAGE PRIOR TO BEGINNING TESTING. PHOTOGRAPH ANY DEFECTS/ABNORMALITIES. MARK ALL PHOTOS WITH THE DATE, TIME, QUALIFICATION D/N, STEP NUMBER AND TECHNICIAN NAME. LOG PHOTOS PER **D/N 75879** (SOP-085-39), **OR EQUIVALENT DOCUMENTATION METHOD**. ATTACH ALL PHOTOS TO THIS DOCUMENT. ENSURE THE MAGNIFICATION USED FOR EACH PHOTOGRAPH IS RECORDED IN THE TITLE (IF APPLICABLE). ENSURE THIS SECTION IS COMPLETED PRIOR TO PROCEEDING TO THE NEXT SECTION.

**NOTE: THROUGHOUT THE TESTING, ENSURE THAT ALL PHOTOS ARE GIVEN AN APPROPRIATE DESCRIPTIVE LABEL AND ARE ATTACHED (ELECTRONIC AND COLOR HARD COPIES) TO THE SECTION OF THIS TEST PROCEDURE TO WHICH THAT PHOTO RELATES. A PHOTOGRAPHIC RECORD OF ALL TEST SET-UPS IS REQUIRED.**

### COMMENTS:

---



---



---



---

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                               |                           |                               |                      |
|-------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                               | Page<br>7 of 39           | Reference<br>QTP-309-40       | Class<br>40          |

6.0 **PIN STRAIN TO FAILURE TEST PROCEDURE:**

- 6.1 OBTAIN 6 NEW PINS (PREVIOUSLY UNTESTED) . INSTALL STRAIN GAGES PER THE STRAIN GAGE INSTALLATION SECTION OF **D/N 166319** (QTP-310-40) . TEST TWO PINS PER THE RAPID STRAIN RATE TEST PROCEDURE SECTION OF **D/N 166319** AND TEST THE REMAINING 4 PINS PER THE LONG TERM PIN STRAIN TEST PROCEDURE SECTION OF **D/N 166319** (ENGINEER WILL PROVIDE TEST STRAIN AND DURATION VALUES WITHIN **D/N 166319**) .

| TABLE 1 - HP NAUTILUS PIN INFORMATION FOR STRAIN TESTING |                  |                                 |                   |
|----------------------------------------------------------|------------------|---------------------------------|-------------------|
| PART NUMBER                                              | REFERENCE NUMBER | DESCRIPTION                     | QUANTITY REQUIRED |
| 1047261                                                  | HPR-244-01       | HIGH POWER PLUG ELECTRICAL STEM | 6                 |

- 6.2 QUALITY ENGINEERING TO ENSURE THIS SECTION IS COMPLETE INCLUDING ALL TEST RESULTS, PHOTOGRAPHS AND REFERENCE INFORMATION ARE LABELED AND ATTACHED. ALSO, ENSURE ALL ELECTRONIC DATA IS COPIED AND THE STORAGE DEVICE (DISK) IS APPROPRIATELY PLACED WITHIN THIS SECTION OF THE PROCEDURE.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

QUALITY ENGINEER: \_\_\_\_\_ DATE: \_\_\_\_\_

**NOTE: THE STEMS USED IN THIS SECTION (PIN STRAIN TO FAILURE TEST) CANNOT BE USED TO SUPPORT ANY ADDITIONAL TESTING IN THIS PROCEDURE, AS THEY ARE PERMANENTLY DAMAGED.**

|                                                                                   |                               |                                   |                          |
|-----------------------------------------------------------------------------------|-------------------------------|-----------------------------------|--------------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br><br>1-29-08 | Document No.<br><br><b>166318</b> | Revision<br><br><b>A</b> |
|                                                                                   | Page<br><br>8 of 39           | Reference<br><br>QTP-309-40       | Class<br><br>40          |

7.0 **PARTIAL DISCHARGE TEST PROCEDURE:**

**NOTE: THESE PINS WILL BE USED WITH A TEST FIXTURE TO MIMIC THE ACTUAL DEPLOYED GROUND PLANE TO REDUCE THE SUSCEPTIBILITY OF THE TEST TO THE ACTUAL TEST SETUP.**

**CAUTION: THE NEXT STEPS WILL REQUIRE THE USE OF HIGH VOLTAGE, WHICH CAN LEAD TO INJURY AND CAUSE SERIOUS DAMAGE TO TEST EQUIPMENT IF NOT SET-UP PROPERLY. PLEASE EXERCISE EXTREME CAUTION DURING OPERATION TO ENSURE SAFETY AND PROTECT EQUIPMENT.**

**NOTE: IF FAILING READINGS ARE TAKEN OR ANY DAMAGE IS NOTED AT ANY TIME DURING TESTING, CONTACT ENGINEERING, INITIATE A DISCREPANCY REPORT, RECORD THE DR NUMBER AND ATTACH A COPY OF THE DISPOSITIONED DR TO THIS DOCUMENT FOR RETENTION. PHOTOGRAPH ANY SIGNS OF DAMAGE.**

7.1 RECORD THE NAME OF ALL OPERATORS AND OBSERVERS INVOLVED WITH THIS TEST.

OPERATOR/OBSERVER NAME(S) : \_\_\_\_\_ ;

DATE: \_\_\_\_\_

7.2 RECORD THE TYPE, ODI ID NUMBER, LAST CALIBRATION DATE AND NEXT CALIBRATION DATE INFORMATION FOR ANY TEST EQUIPMENT USED.

**TABLE 2 - PARTIAL DISCHARGE CALIBRATION INFORMATION**

| EQUIPMENT TYPE | ODI ID NUMBER | LAST CALIBRATION DATE | NEXT CALIBRATION DATE |
|----------------|---------------|-----------------------|-----------------------|
|                |               |                       |                       |
|                |               |                       |                       |
|                |               |                       |                       |
|                |               |                       |                       |
|                |               |                       |                       |
|                |               |                       |                       |
|                |               |                       |                       |

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                               |                           |                               |                      |
|-------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                               | Page<br>9 of 39           | Reference<br>QTP-309-40       | Class<br>40          |

- 7.3 PHOTOGRAPH TEST SET-UP AND RELATED PORTIONS OF THE TEST DURING PROCEDURES PER **D/N 75879 (SOP-085-39), OR EQUIVALENT DOCUMENTATION METHOD**. LABEL AND ATTACH THE PHOTOGRAPHS TO THIS DOCUMENT.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 7.4 ENSURE THAT ALL REQUIRED INFORMATION HAS BEEN RECORDED REGARDING THE TEST EQUIPMENT AND TEST ARTICLES.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 7.5 OBTAIN THE FOLLOWING COMPONENTS:

| TABLE 3 - COMPONENTS REQUIRED FOR PD TESTING |                  |                                 |                   |
|----------------------------------------------|------------------|---------------------------------|-------------------|
| PART NUMBER                                  | REFERENCE NUMBER | DESCRIPTION                     | QUANTITY REQUIRED |
| 1047261                                      | HPR-244-01       | HIGH POWER PLUG ELECTRICAL STEM | 12                |
| 1050515                                      | HPR-248-01       | PARTIAL DISCHARGE TEST FIXTURE  | 1                 |

**NOTE: ALL ELECTRICAL STEMS AND RUBBER PARTS MUST BE NEW/UNUSED.**

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 7.6 MARK ALL OF THE PINS 1 THROUGH 12 USING A PERMANENT MARKING METHOD ON A PORTION OF THE PIN THAT WILL NOT INTERFERE WITH TESTING.

**NOTE: IF ANY IDENTIFICATION NUMBERS FADE DURING TESTING, RE-APPLY THEM TO MAINTAIN TRACEABILITY.**

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

SUBJECT: **HIGH POWER NAUTILUS ELECTRICAL  
STEM ENGINEERING QUALIFICATION**

Effective Date

1-29-08

Document No.

**166318**

Revision

**A**

Page

10 of 39

Reference

QTP-309-40

Class

40

- 7.7 CLEAN THE PINS (P/N 1047261) BY THOROUGHLY WIPING THE SURFACE WITH CLEAN ALCOHOL AND A NEW, LINT-FREE CLOTH.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 7.8 IF TEST LEADS ARE NOT ALREADY SOLDERED TO P/N 1050130 SOLDER POTS AND READY FOR TEST, CLEAN APPROXIMATELY 1 FOOT OF THE TEST LEAD ENDS (WIRE P/N 1034781 OR P/N 1034774) WITH ALCOHOL AND SOLDER THE WIRE LEADS TO P/N 1050130 PER THE GENERAL REQUIREMENTS OF **D/N 10637** (SOP-021-39).

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

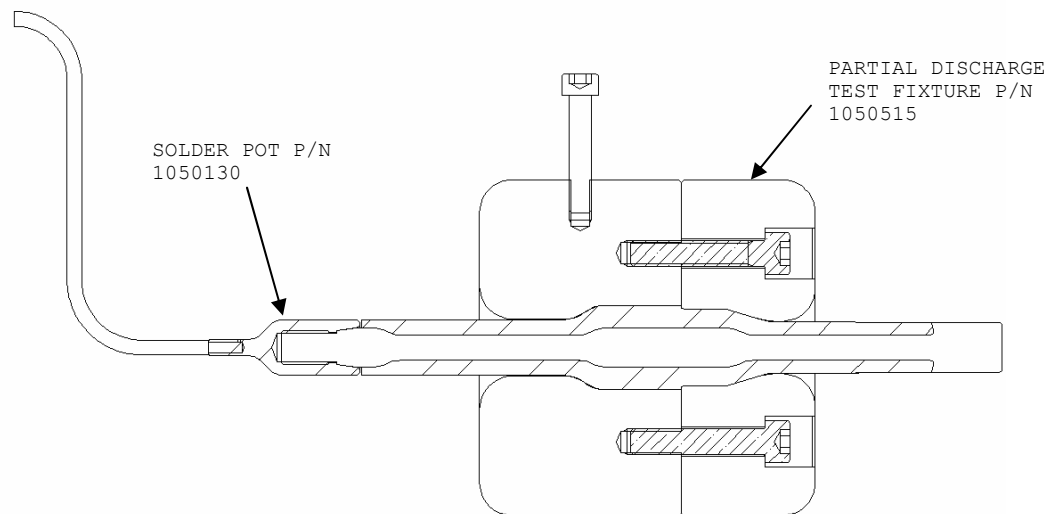
- 7.9 THREAD THE SOLDER POT (P/N 1050130) ONTO THE PIN.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 7.10 REPEAT STEP 7.8 AND 7.9 FOR ALL PINS THAT ARE TO BE TESTED.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 7.11 ASSEMBLE THE PINS INTO THE PARTIAL DISCHARGE TEST FIXTURE USING FIGURE 1 FOR GUIDANCE.



**FIGURE 1: STEM PARTIAL DISCHARGE TEST CONFIGURATION**

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

SUBJECT: **HIGH POWER NAUTILUS ELECTRICAL  
STEM ENGINEERING QUALIFICATION**

Effective Date

1-29-08

Document No.

**166318**

Revision

**A**

Page

11 of 39

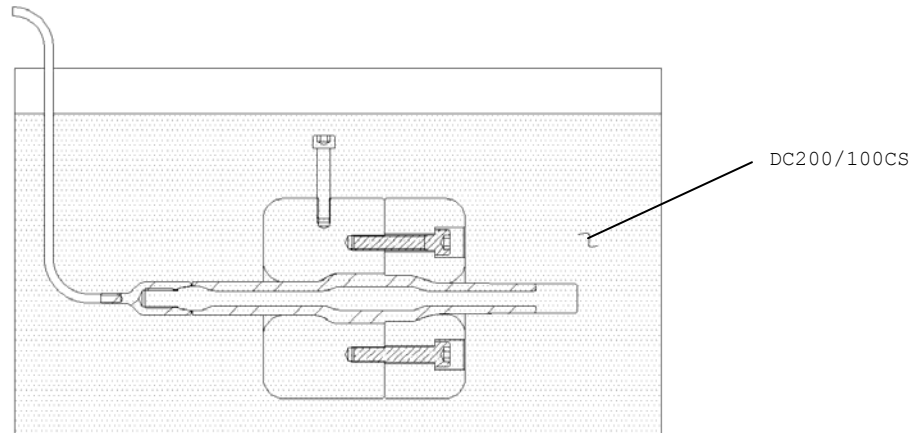
Reference

QTP-309-40

Class

40

7.12 PLACE THE ASSEMBLY INTO A CONTAINER OF CLEAN DC200/100 CS SILICONE OIL, ENSURING THAT IT IS COMPLETELY SUBMERGED WHILE LEAVING THE FREE END OF THE WIRE OUT OF THE OIL BATH. REFER TO FIGURE 2 FOR THE GENERAL TEST SET-UP. PULL A VACUUM ON THE OIL BATH FOR A MINIMUM OF 45 MINUTES TO REMOVE AS MUCH AIR FROM THE ASSEMBLY AS POSSIBLE.



**FIGURE 2:** ASSEMBLED TEST FIXTURE IN OIL BATH

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

**NOTE: ONCE THE PIN/FIXTURE ASSEMBLY IS ASSEMBLED IN THE OIL, THE ASSEMBLY SHALL NOT BE REMOVED UNTIL THE COMPLETION OF PARTIAL DISCHARGE TESTING FOR THAT PIN.**

SUBJECT: **HIGH POWER NAUTILUS ELECTRICAL  
STEM ENGINEERING QUALIFICATION**

Effective Date

1-29-08

Document No.

**166318**

Revision

**A**

Page

12 of 39

Reference

QTP-309-40

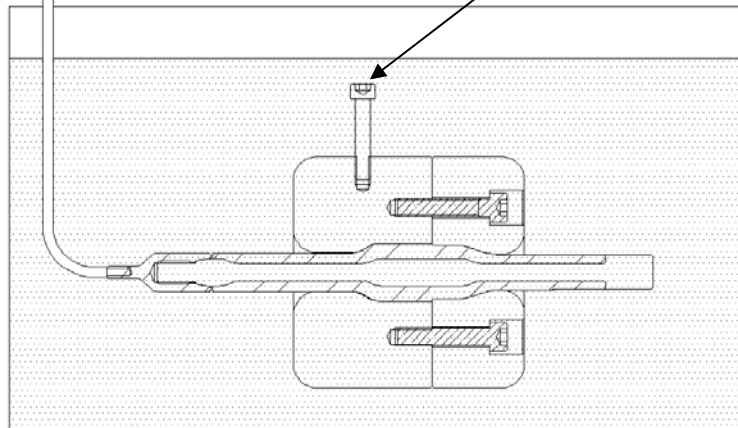
Class

40

7.13 WHILE THE PIN/FIXTURE ASSEMBLY IS STILL SUBMERGED IN OIL,  
GROUND THE TEST FIXTURE ONLY AND CONNECT THE TEST LEAD TO  
THE HIGH VOLTAGE AC SOURCE. REFER TO FIGURE 3 FOR GUIDANCE.

HIGH VOLTAGE AC  
SOURCE TEST LEAD  
CONNECTED HERE

GROUND LEAD  
CONNECTED HERE



**FIGURE 3: TEST LEAD ATTACHMENT TO TEST ASSEMBLY**

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

7.14 CONTACT ENGINEERING AT THIS POINT TO WITNESS THE PD  
MEASUREMENTS.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

**NOTE: USE EXTREME CAUTION WHEN AROUND HIGH VOLTAGE, FOLLOW  
ALL POSSIBLE PRECAUTIONS AND LAB GUIDELINES.**

SUBJECT: **HIGH POWER NAUTILUS ELECTRICAL  
STEM ENGINEERING QUALIFICATION**

Effective Date

1-29-08

Document No.

**166318**

Revision

**A**

Page

13 of 39

Reference

QTP-309-40

Class

40

7.15 TEST THE PINS PER **D/N 165233** (ATP-117-40) AT A TEST VOLTAGE OF 7.2 KVAC FOR 1 MINUTE AND RECORD THE RESULTS IN TABLE 4. ATTACH THE PARTIAL DISCHARGE TEST PLOT FOR EACH PIN AT THE END OF THIS PROCEDURE, ENSURING THAT THIS STEP NUMBER AND PIN NUMBER IS RECORDED CONSISTENTLY ON THE SAME LOCATION ON EACH PLOT. PASS IS  $\leq 10\text{pC}$ .

**TABLE 4 - BASELINE PD TESTING RESULTS**

| PIN # | PIN BATCH NUMBER | ODI REV. NUMBER | DWG. REV. NUMBER | PARTIAL DISCHARGE (pC) | INCEPTION VOLTAGE (VAC) | EXTINCTION VOLTAGE (VAC) |
|-------|------------------|-----------------|------------------|------------------------|-------------------------|--------------------------|
| 1     |                  |                 |                  |                        |                         |                          |
| 2     |                  |                 |                  |                        |                         |                          |
| 3     |                  |                 |                  |                        |                         |                          |
| 4     |                  |                 |                  |                        |                         |                          |
| 5     |                  |                 |                  |                        |                         |                          |
| 6     |                  |                 |                  |                        |                         |                          |
| 7     |                  |                 |                  |                        |                         |                          |
| 8     |                  |                 |                  |                        |                         |                          |
| 9     |                  |                 |                  |                        |                         |                          |
| 10    |                  |                 |                  |                        |                         |                          |
| 11    |                  |                 |                  |                        |                         |                          |
| 12    |                  |                 |                  |                        |                         |                          |

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

7.16 REMOVE THE PINS FROM THE PARTIAL DISCHARGE TEST FIXTURE, CAREFULLY MAINTAINING THE NUMBERING SYSTEM ON THE PINS.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

SUBJECT: **HIGH POWER NAUTILUS ELECTRICAL  
STEM ENGINEERING QUALIFICATION**

Effective Date

1-29-08

Document No.

**166318**

Revision

**A**

Page

14 of 39

Reference

QTP-309-40

Class

40

7.17 VISUALLY INSPECT THE PINS AND RECORD ANY COMMENTS CONCERNING  
THE TEST RESULTS IN TABLE 5.

**TABLE 5 - COMMENTS ON BASELINE PD TESTING RESULTS**

| <b>PIN<br/>NUMBER</b> | <b>COMMENTS</b> |
|-----------------------|-----------------|
| 1                     |                 |
| 2                     |                 |
| 3                     |                 |
| 4                     |                 |
| 5                     |                 |
| 6                     |                 |
| 7                     |                 |
| 8                     |                 |
| 9                     |                 |
| 10                    |                 |
| 11                    |                 |
| 12                    |                 |

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

7.18 QUALITY ENGINEERING TO ENSURE THIS SECTION IS COMPLETE  
INCLUDING ALL TEST RESULTS, PHOTOGRAPHS AND REFERENCE  
INFORMATION ARE LABELED AND ATTACHED. ALSO, ENSURE ALL  
ELECTRONIC DATA IS COPIED AND THE STORAGE DEVICE (DISK) IS  
APPROPRIATELY PLACED WITHIN THIS SECTION OF THE PROCEDURE.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

QUALITY ENGINEER: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>15 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

## 8.0 HIGH PRESSURE SOAK TESTING:

**CAUTION: THE NEXT STEPS WILL REQUIRE THE USE OF HIGH PRESSURE WHICH CAN CAUSE SERIOUS DAMAGE TO TEST EQUIPMENT AND LEAD TO INJURY IF NOT SET-UP PROPERLY. PLEASE EXERCISE EXTREME CAUTION DURING OPERATION TO ENSURE SAFETY AND PROTECT EQUIPMENT.**

**NOTE: THE PRESSURE VESSEL WILL BE OPERATED AT AMBIENT TEMPERATURE.**

**NOTE: IF ANY DAMAGE IS NOTED AT ANY TIME DURING TESTING, CONTACT ENGINEERING, INITIATE A DISCREPANCY REPORT, RECORD THE DR NUMBER AND ATTACH A COPY OF THE DISPOSITIONED DR TO THIS DOCUMENT FOR RETENTION. PHOTOGRAPH ANY SIGNS OF DAMAGE.**

8.1 RECORD THE NAME OF ALL OPERATORS AND OBSERVERS INVOLVED WITH THIS TEST.

OPERATOR/OBSERVER NAME(S) : \_\_\_\_\_ ;  
\_\_\_\_\_ ; \_\_\_\_\_ ;

DATE : \_\_\_\_\_

**NOTE: A CHART RECORDER OR EQUIVALENT MEANS OF DATA AQUISITION SHALL BE USED TO RECORD PRESSURE AND TIME AS A MINIMUM DURING ALL RELEVANT TESTING. THE CHART RECORDER OR EQUIVALENT SHALL BEAR A VALID CALIBRATION CERTIFICATE. THE ACCURACY OF THE DATA AQUISITION SYSTEM SHALL BE WITHIN  $\pm 1\%$ .**

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>16 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

- 8.2 RECORD THE TYPE, ODI ID NUMBER, LAST CALIBRATION DATE, AND NEXT CALIBRATION DATE INFORMATION IN TABLE 6 FOR ANY TEST EQUIPMENT USED.

**TABLE 6 - PRESSURE TESTING CALIBRATION INFORMATION**

| EQUIPMENT TYPE | ODI ID NUMBER | LAST CALIBRATION DATE | NEXT CALIBRATION DATE |
|----------------|---------------|-----------------------|-----------------------|
|                |               |                       |                       |
|                |               |                       |                       |
|                |               |                       |                       |
|                |               |                       |                       |
|                |               |                       |                       |
|                |               |                       |                       |
|                |               |                       |                       |

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

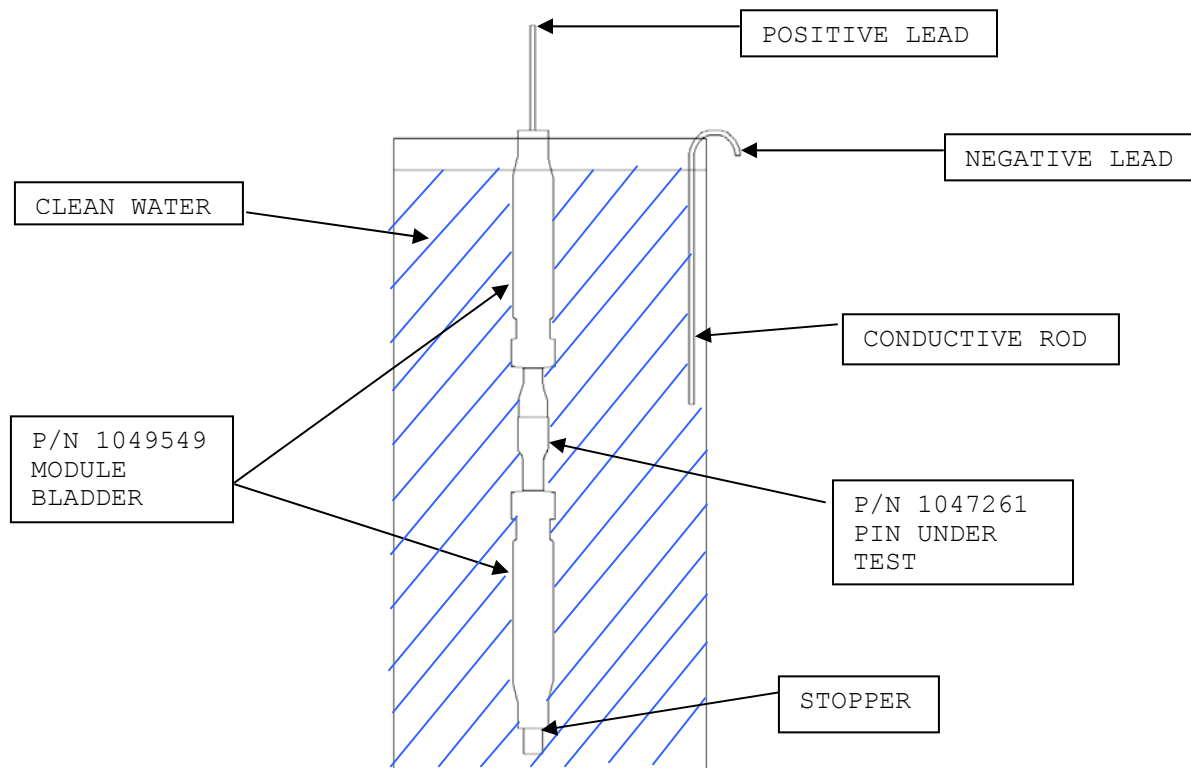
- 8.3 ENSURE THAT ALL REQUIRED INFORMATION HAS BEEN RECORDED REGARDING THE TEST EQUIPMENT AND TEST ARTICLES.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 8.4 OBTAIN PINS 1 THROUGH 6 THAT WERE TESTED IN SECTION 7.0.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 8.5 PERFORM AN IR TEST ON EACH PIN AT 10 KVDC FOR 10 MINUTE DWELLS. THIS TEST IS TO BE DONE BY WATERBLOCKING THE ENDS OF THE PINS AND SUBMERGING THEM IN A WATER BATH AS SEEN IN FIGURE 4. RECORD THE RESULTS IN TABLE 7. PASS  $\geq 100 \text{ G}\Omega$ .



**FIGURE 4: INSULATION RESISTANCE TEST SET-UP**

| <b>TABLE 7 - PRESSURE TEST BASELINE INSULATION RESISTANCE</b> |                                            |
|---------------------------------------------------------------|--------------------------------------------|
| PIN NUMBER                                                    | INSULATION RESISTANCE ( $\text{G}\Omega$ ) |
| 1                                                             |                                            |
| 2                                                             |                                            |
| 3                                                             |                                            |
| 4                                                             |                                            |
| 5                                                             |                                            |
| 6                                                             |                                            |

PASS/FAIL (CIRCLE ONE)

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 8.6 OBTAIN THE APPROPRIATE COMPONENTS TO BUILD TWO EACH OF P/N 1049505 WITH THE TEST STEMS.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

SUBJECT: **HIGH POWER NAUTILUS ELECTRICAL  
STEM ENGINEERING QUALIFICATION**

Effective Date

1-29-08

Document No.

**166318**

Revision

**A**

Page

18 of 39

Reference

QTP-309-40

Class

40

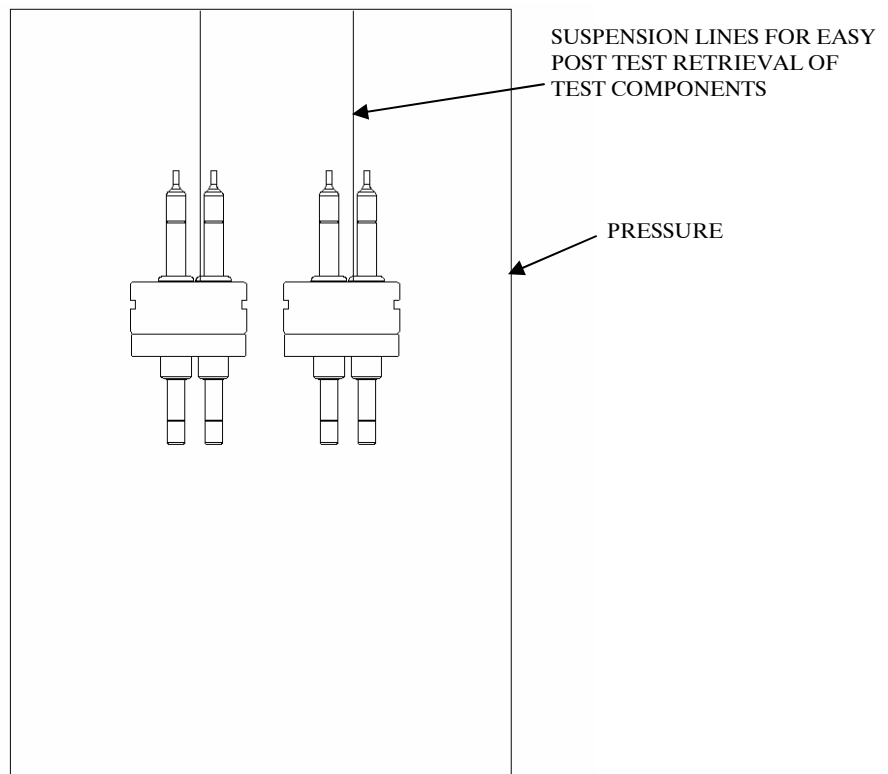
- 8.7 ASSEMBLE P/N 1049505 PER PROCEDURE **D/N 165286** (HPR-207-41) USING PINS 1 THROUGH 3.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 8.8 ASSEMBLE AN ADDITIONAL P/N 1049505 PER PROCEDURE **D/N 165286** (HPR-207-41) USING PINS 4 THROUGH 6.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 8.9 INSTALL THE TWO TEST ASSEMBLIES INTO THE PRESSURE VESSEL, SAFELY SUSPENDING THEM SO THAT THEY WILL NOT BE DAMAGED DURING INSTALLATION OR TESTING. REFER TO FIGURE 5 FOR GUIDANCE.



**FIGURE 5:** EXAMPLE OF TWO SUSPENDED 3-WAY PIN TEST MODULES

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>19 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

8.10 PHOTOGRAPH TEST SET-UP AND RELATED PORTIONS OF THE TEST DURING PROCEDURES PER **D/N 75879 (SOP-085-39), OR EQUIVALENT DOCUMENTATION METHOD**. LABEL AND ATTACH THE PHOTOGRAPHS TO THIS DOCUMENT.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

8.11 PREPARE THE TANK FOR TESTING PER THE MANUFACTURERS INSTRUCTIONS AND STANDARD LAB PRACTICES.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

SUBJECT: **HIGH POWER NAUTILUS ELECTRICAL  
STEM ENGINEERING QUALIFICATION**

Effective Date

1-29-08

Document No.

**166318**

Revision

**A**

Page

20 of 39

Reference

QTP-309-40

Class

40

8.12 PRESSURE TEST THE ASSEMBLIES PER THE FOLLOWING TEST SCHEDULE (TABLE 8). PRIOR TO THE START OF THE TEST, INITIATE THE DATA ACQUISITION SYSTEM, RECORDING THE VESSEL PRESSURE AND TIME AT A RATE OF 1 READING PER MINUTE. THIS DATA WILL BE USED TO GENERATE PLOTS OF THE CYCLES AND HOLD.

**TABLE 8 - PRESSURE TEST SCHEDULE**

|                       | <b>Cycle 1</b>  |    | <b>Cycle 2</b>  |    | <b>Cycle 3</b>  |    |
|-----------------------|-----------------|----|-----------------|----|-----------------|----|
| <b>Pressure (psi)</b> | 20,000          | 0  | 20,000          | 0  | 20,000          | 0  |
| <b>Time (minutes)</b> | 10              | 10 | 10              | 10 | 10              | 10 |
|                       | <b>Cycle 4</b>  |    | <b>Cycle 5</b>  |    | <b>Cycle 6</b>  |    |
| <b>Pressure (psi)</b> | 20,000          | 0  | 20,000          | 0  | 20,000          | 0  |
| <b>Time (minutes)</b> | 10              | 10 | 10              | 10 | 10              | 10 |
|                       | <b>Cycle 7</b>  |    | <b>Cycle 8</b>  |    | <b>Cycle 9</b>  |    |
| <b>Pressure (psi)</b> | 20,000          | 0  | 20,000          | 0  | 20,000          | 0  |
| <b>Time (minutes)</b> | 10              | 10 | 10              | 10 | 10              | 10 |
|                       | <b>Cycle 10</b> |    |                 |    | <b>Cycle 12</b> |    |
| <b>Pressure (psi)</b> | 20,000          | 0  | 20,000          | 0  | 20,000          | 0  |
| <b>Time (minutes)</b> | 10              | 10 | 10              | 10 | 10              | 10 |
|                       | <b>Cycle 13</b> |    | <b>Cycle 14</b> |    | <b>Cycle 15</b> |    |
| <b>Pressure (psi)</b> | 20,000          | 0  | 20,000          | 0  | 20,000          | 0  |
| <b>Time (minutes)</b> | 10              | 10 | 10              | 10 | 10              | 10 |
|                       | <b>Cycle 16</b> |    | <b>Cycle 17</b> |    | <b>Cycle 18</b> |    |
| <b>Pressure (psi)</b> | 20,000          | 0  | 20,000          | 0  | 20,000          | 0  |
| <b>Time (minutes)</b> | 10              | 10 | 10              | 10 | 10              | 10 |
|                       | <b>Cycle 19</b> |    | <b>Cycle 20</b> |    | <b>Hold</b>     |    |
| <b>Pressure (psi)</b> | 20,000          | 0  | 20,000          | 0  | 20,000          | 0  |
| <b>Time (minutes)</b> | 10              | 10 | 10              | 10 | 4,320           | 10 |

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_



|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>22 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

**NOTE: FAILURE TO HAVE AN ENGINEERING REPRESENTATIVE PRESENT DURING THE DISASSEMBLY AND INSPECTION OF THE TEST ARTICLES WILL VOID THIS QUALIFICATION TEST.**

**NOTE: ENSURE THAT ANY REMOVED PARTS ARE BAGGED AND TAGGED.**

8.14 WITH ENGINEERING PRESENT, DISASSEMBLE THE ASSEMBLIES AND INSPECT EACH PIN FOR SIGNS OF DAMAGE. RECORD ANY OBSERVATIONS, INCLUDING THE FAILURE MODE IF PRESENT. TAKE DIGITAL PHOTOS OF EACH PIN (INCLUDING DAMAGED AREAS). MARK ALL PHOTOS WITH THE PIN IDENTIFICATION, DATE, TIME, QUALIFICATION D/N, REVISION, STEP NUMBER AND TECHNICIAN NAME. ATTACH ALL PHOTOS TO THIS DOCUMENT.

**NOTE: IF ANY SIGNS OF DAMAGE ARE PRESENT, CONTACT ENGINEERING, INITIATE A DISCREPANCY REPORT, RECORD THE DR NUMBER AND ATTACH A COPY OF THE DISPOSITIONED DR TO THIS DOCUMENT FOR RETENTION. PHOTOGRAPH ANY SIGNS OF DAMAGE.**

OBSERVATIONS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>23 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

8.15 INSPECT EACH PIN UNDER THE MICROSCOPE AND PHOTOGRAPH ANY DEFECTS/ABNORMALITIES. MARK ALL PHOTOS WITH THE DATE, TIME, QUALIFICATION D/N, REVISION, STEP NUMBER AND TECHNICIAN NAME. ATTACH ALL PHOTOS TO THIS DOCUMENT. ENSURE THAT THE MAGNIFICATION USED FOR EACH PHOTOGRAPH IS RECORDED IN THE TITLE. DOCUMENT ALL POINTS OF INTEREST LOCATIONS.

OBSERVATIONS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

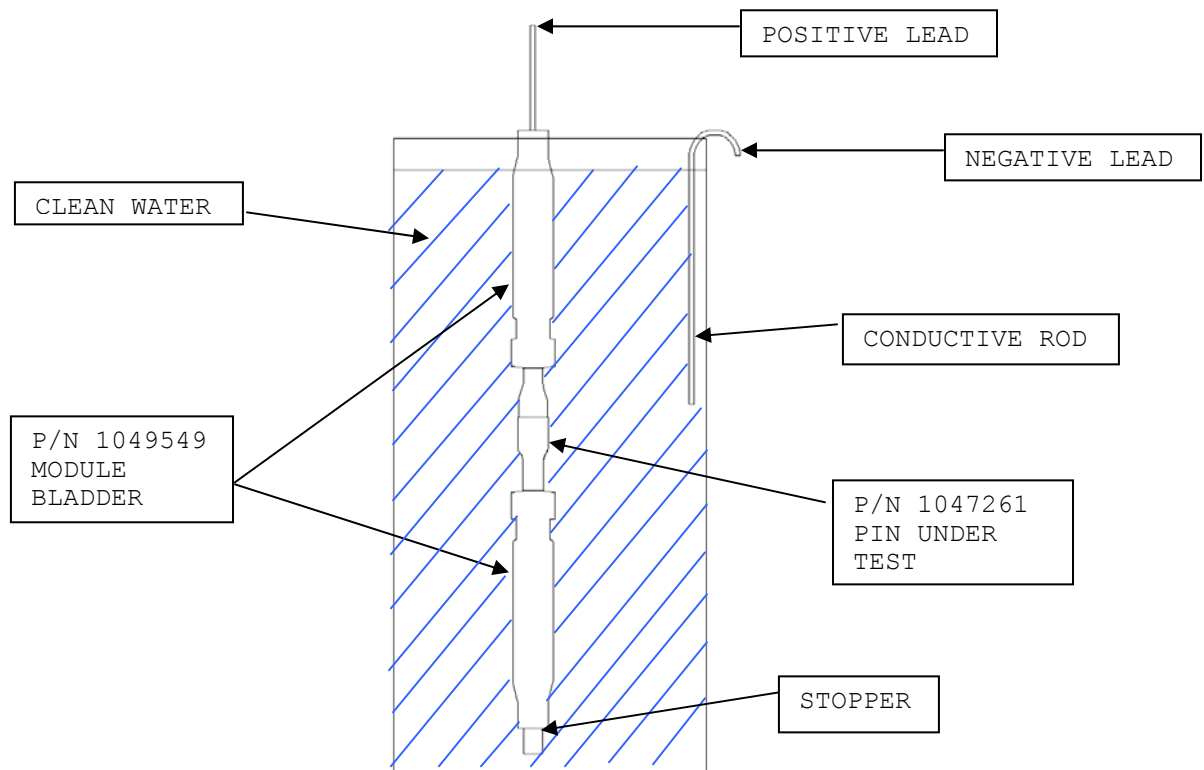
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

8.16 PERFORM AN IR TEST ON EACH PIN AT 10 KVDC FOR 10 MINUTE DWELLS. THIS TEST IS TO BE DONE BY WATERBLOCKING THE ENDS OF THE PINS AND SUBMERGING THEM IN A WATER BATH AS SEEN IN FIGURE 6. RECORD THE RESULTS IN TABLE 9. PASS  $\geq 100 \text{ G}\Omega$ .



**FIGURE 6: INSULATION RESISTANCE TEST SET-UP**

| TABLE 9 - POST PRESSURE TEST INSULATION RESISTANCE |                                            |
|----------------------------------------------------|--------------------------------------------|
| PIN NUMBER                                         | INSULATION RESISTANCE ( $\text{G}\Omega$ ) |
| 1                                                  |                                            |
| 2                                                  |                                            |
| 3                                                  |                                            |
| 4                                                  |                                            |
| 5                                                  |                                            |
| 6                                                  |                                            |

PASS/FAIL (CIRCLE ONE)

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

8.17 PRODUCE CHARTS OF TEST RESULTS. ATTACH A COPY OF ALL RELEVANT DOCUMENTATION TO THIS DOCUMENT FOR RETENTION.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>25 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

8.18 QUALITY ENGINEERING TO ENSURE THIS SECTION IS COMPLETE INCLUDING ALL TEST RESULTS, PHOTOGRAPHS AND REFERENCE INFORMATION ARE LABELED AND ATTACHED. ALSO, ENSURE ALL ELECTRONIC DATA IS COPIED AND THE STORAGE DEVICE (DISK) IS APPROPRIATELY PLACED WITHIN THIS SECTION OF THE PROCEDURE.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

QUALITY ENGINEER: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>26 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

9.0 **POST PRESSURE TESTING PARTIAL DISCHARGE TESTING:**

9.1 PINS 1 THROUGH 6 (PREVIOUSLY TESTED IN THE PARTIAL DISCHARGE TEST PROCEDURE SECTION AND THE HIGH PRESSURE SOAK TESTING SECTION) WILL BE USED IN THIS SECTION.

9.2 CLEAN ALL OF THE PRESSURE TESTED PINS BY THOROUGHLY WIPING THE PINS WITH CLEAN ALCOHOL AND A CLEAN LINT-FREE CLOTH.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

9.3 IF TEST LEADS ARE NOT ALREADY SOLDERED TO P/N 1050130 SOLDER POTS AND READY FOR TEST, CLEAN APPROXIMATELY 1 FOOT OF THE TEST LEAD ENDS (WIRE P/N 1034781 OR P/N 1034774) WITH ALCOHOL AND SOLDER THE WIRE LEADS TO P/N 1050130 PER THE GENERAL REQUIREMENTS OF **D/N 10637** (SOP-021-39).

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

9.4 THREAD THE SOLDER POT (P/N 1050130) ONTO THE PIN.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

9.5 REPEAT STEP 9.3 AND 9.4 FOR ALL PINS THAT ARE TO BE TESTED.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

9.6 ASSEMBLE THE PINS INTO THE PARTIAL DISCHARGE TEST FIXTURE USING FIGURE 1 FOR GUIDANCE.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

9.7 PLACE THE ASSEMBLY INTO A CONTAINER OF CLEAN DC200/100 CS SILICONE OIL, ENSURING THAT IT IS COMPLETELY SUBMERGED WHILE LEAVING THE FREE END OF THE WIRE OUT OF THE OIL BATH. REFER TO FIGURE 2 FOR THE GENERAL TEST SET-UP. PULL A VACUUM ON THE OIL BATH FOR A MINIMUM OF 45 MINUTES TO REMOVE AS MUCH AIR FROM THE ASSEMBLY AS POSSIBLE.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

**NOTE: ONCE THE PIN/FIXTURE ASSEMBLY IS ASSEMBLED IN THE OIL, THE ASSEMBLY SHALL NOT BE REMOVED UNTIL THE COMPLETION OF PARTIAL DISCHARGE TESTING FOR THAT PIN.**

|                                                                                   |                |               |          |
|-----------------------------------------------------------------------------------|----------------|---------------|----------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date | Document No.  | Revision |
|                                                                                   | 1-29-08        | <b>166318</b> | <b>A</b> |
|                                                                                   | Page           | Reference     | Class    |
|                                                                                   | 27 of 39       | QTP-309-40    | 40       |

9.8 WHILE THE PIN/FIXTURE ASSEMBLY IS STILL SUBMERGED IN OIL, GROUND THE TEST FIXTURE ONLY AND CONNECT THE TEST LEAD TO THE HIGH VOLTAGE AC SOURCE. REFER TO FIGURE 3 FOR GUIDANCE.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

9.9 CONTACT ENGINEERING AT THIS POINT TO WITNESS THE PD MEASUREMENTS.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

**NOTE: USE EXTREME CAUTION WHEN AROUND HIGH VOLTAGE, FOLLOW ALL POSSIBLE PRECAUTIONS AND LAB GUIDELINES.**

9.10 TEST PINS 1 THROUGH 6 PER **D/N 165233** (ATP-117-40) AT A TEST VOLTAGE OF 7.2 KVAC FOR 1 MINUTE AND RECORD THE RESULTS IN TABLE 10. ATTACH THE PARTIAL DISCHARGE TEST PLOT FOR EACH PIN AT THE END OF THIS PROCEDURE, ENSURING THAT THIS STEP NUMBER AND PIN NUMBER IS RECORDED CONSISTENTLY ON THE SAME LOCATION ON EACH PLOT. PASS IS  $\leq 10\text{pC}$ .

| TABLE 10 - POST PRESSURE PD TESTING RESULTS |                  |                 |                  |                        |                         |                          |
|---------------------------------------------|------------------|-----------------|------------------|------------------------|-------------------------|--------------------------|
| PIN #                                       | PIN BATCH NUMBER | ODI REV. NUMBER | DWG. REV. NUMBER | PARTIAL DISCHARGE (pC) | INCEPTION VOLTAGE (VAC) | EXTINCTION VOLTAGE (VAC) |
| 1                                           |                  |                 |                  |                        |                         |                          |
| 2                                           |                  |                 |                  |                        |                         |                          |
| 3                                           |                  |                 |                  |                        |                         |                          |
| 4                                           |                  |                 |                  |                        |                         |                          |
| 5                                           |                  |                 |                  |                        |                         |                          |
| 6                                           |                  |                 |                  |                        |                         |                          |

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

9.11 RECORD ANY COMMENTS CONCERNING THE TEST RESULTS IN TABLE 11.

| TABLE 11 - COMMENTS ON POST PRESSURE PD TESTING RESULTS |          |
|---------------------------------------------------------|----------|
| PIN NUMBER                                              | COMMENTS |
| 1                                                       |          |
| 2                                                       |          |
| 3                                                       |          |
| 4                                                       |          |
| 5                                                       |          |
| 6                                                       |          |

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>28 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

9.12 QUALITY ENGINEERING TO ENSURE THIS SECTION IS COMPLETE INCLUDING ALL TEST RESULTS, PHOTOGRAPHS AND REFERENCE INFORMATION ARE LABELED AND ATTACHED. ALSO, ENSURE ALL ELECTRONIC DATA IS COPIED AND THE STORAGE DEVICE (DISK) IS APPROPRIATELY PLACED WITHIN THIS SECTION OF THE PROCEDURE.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

QUALITY ENGINEER: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                               |                           |                               |                      |
|-------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                               | Page<br>29 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

## 10.0 HIGH VOLTAGE DC BREAKDOWN TESTING:

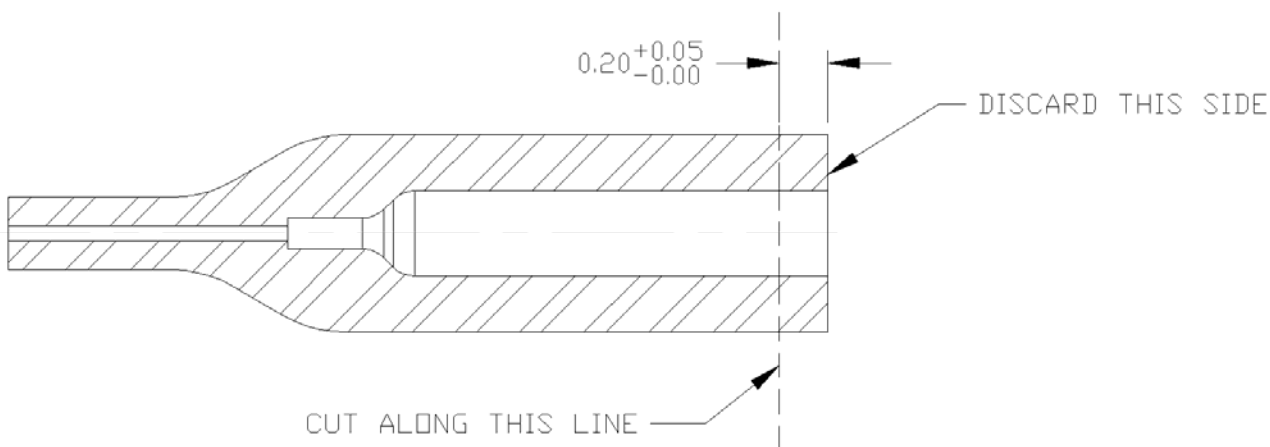
10.1 OBTAIN ALL 12 PINS USED IN THIS PROCEDURE (1 THROUGH 6 WERE PRESSURE TESTED, 7 THROUGH 12 WERE NOT PRESSURE TESTED). OBTAIN A MINIMUM OF ONE NEW BOOT SEAL P/N 1050251 AND A MINIMUM OF ONE NEW RECEPTACLE BLADDER P/N 1049549.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

10.2 SET ASIDE PINS 3 THROUGH 6 AND PINS 9 THROUGH 12. THESE PINS WILL BE TESTED LATER AFTER THE RESULTS OF PINS 1, 2, 7 AND 8 HAVE BEEN APPROVED BY THE ENGINEER.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

10.3 MODIFY BOOT P/N 1050251 PER FIGURE 7 (UNITS ARE IN INCHES).



**FIGURE 7:** CUT LOCATION FOR MODIFIED BOOT DIMENSION

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

10.4 ULTRASONICALLY CLEAN THE MODIFIED BOOT SEAL(S) (P/N 1050251) AND RECEPTACLE BLADDER(S) (P/N 1049549) IN WARM, CLEAN ALCONOX FOR A MINIMUM OF 30 MINUTES. RINSE THE PARTS OFF WITH CLEAN DISTILLED WATER AND ALLOW THEM TO DRY.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

10.5 SET ASIDE THE CLEAN BOOT SEALS AND RECEPTACLE BLADDERS IN A CLEAN CONTAINER. COVER THE CONTAINER AFTER PLACING THE ELASTOMERIC COMPONENTS INTO IT. THESE WILL BE USED LATER IN THE HIGH VOLTAGE DC BREAKDOWN TESTING SECTION OF THIS TEST.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>30 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

10.6 OBTAIN PIN 1.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

10.7 IF TEST LEADS ARE NOT ALREADY SOLDERED TO P/N 1050130 SOLDER POTS AND READY FOR TEST, CLEAN APPROXIMATELY 1 FOOT OF THE TEST LEAD ENDS (WIRE P/N 1034781 OR P/N 1034774) WITH ALCOHOL AND SOLDER THE WIRE LEADS TO P/N 1050130 PER THE GENERAL REQUIREMENTS OF **D/N 10637** (SOP-021-39).

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

10.8 THREAD THE SOLDER POT (P/N 1050130) ONTO THE PIN.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

10.9 REPEAT STEP 10.7 AND 10.8 FOR ALL PINS THAT ARE TO BE TESTED.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>31 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

10.10 ASSEMBLE THE PINS INTO THE PARTIAL DISCHARGE TEST FIXTURE USING FIGURE 1 FOR GUIDANCE.

OPERATOR INITIALS:\_\_\_\_\_ DATE:\_\_\_\_\_

10.11 PLACE THE ASSEMBLY INTO A CONTAINER OF CLEAN DC200/100 CS SILICONE OIL (PREFERABLY ONE THAT THE TESTING IS TO BE CONDUCTED IN), ENSURING THAT IT IS COMPLETELY SUBMERGED WHILE LEAVING THE FREE END OF THE WIRE OUT OF THE OIL BATH. REFER TO FIGURE 2 THE GENERAL TEST SET-UP. PLACE THE MODIFIED BOOT SEAL (P/N 1050251), AND RECEPTACLE MODULE BLADDER (P/N 1049549) INTO THE SAME CONTAINER OF OIL. PULL A VACUUM ON THE OIL BATH FOR A MINIMUM OF 45 MINUTES TO REMOVE AS MUCH AIR FROM THE ASSEMBLY AND ELASTOMERIC COMPONENTS AS POSSIBLE.

OPERATOR INITIALS:\_\_\_\_\_ DATE:\_\_\_\_\_

**NOTE: ONCE THE PIN/FIXTURE ASSEMBLY IS ASSEMBLED IN THE OIL, THE ASSEMBLY SHALL NOT BE REMOVED UNTIL THE COMPLETION OF PARTIAL DISCHARGE TESTING FOR THAT PIN.**

10.12 WHILE SUBMERGED IN THE DEGASSED OIL, SLIDE THE MODIFIED BOOT SEAL P/N 1050251 DOWN THE TEST LEAD UNTIL IT IS PROPERLY SEATED ONTO THE STEM. ENSURE THAT ALL THE AIR IS REMOVED FROM THE INSIDE OF THE BOOT SEAL. WORK AS MUCH OIL OUT OF THE BOOTS AS POSSIBLE.

OPERATOR INITIALS:\_\_\_\_\_ DATE:\_\_\_\_\_

SUBJECT: **HIGH POWER NAUTILUS ELECTRICAL  
STEM ENGINEERING QUALIFICATION**

Effective Date

1-29-08

Document No.

**166318**

Revision

**A**

Page

32 of 39

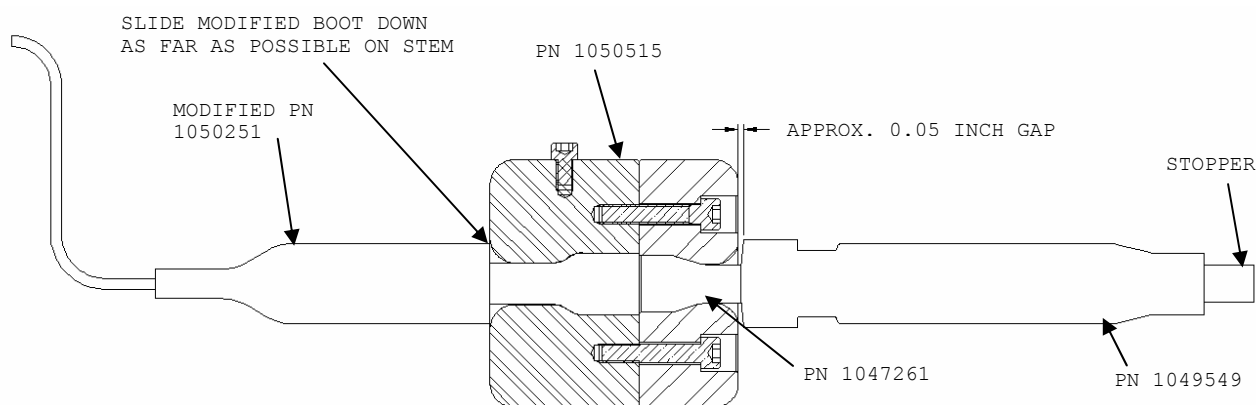
Reference

QTP-309-40

Class

40

- 10.13 WHILE SUBMERGED IN OIL, ENSURE THAT ALL THE AIR IS REMOVED FROM THE INSIDE OF THE BLADDERS AND SLIDE THE RECEPTACLE MODULE BLADDER (P/N 1049549) OVER THE PIN CONTACT TO THE POINT WHERE A GAP OF APPROXIMATELY 0.05 INCH IS MAINTAINED BETWEEN THE END OF THE BLADDER AND THE PD FIXTURE. INSERT A STOPPER INTO THE OPEN END OF THE BLADDER, MAKING SURE NOT TO TRAP ANY AIR IN THE BLADDER DURING INSTALLATION. REFER TO FIGURE 8 FOR PROPER TEST CONFIGURATION.



**FIGURE 8:** HIGH VOLTAGE DC BREAKDOWN TEST CONFIGURATION

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 10.14 WHILE THE PIN/FIXTURE ASSEMBLY IS STILL SUBMERGED IN OIL, GROUND THE TEST FIXTURE ONLY AND CONNECT THE TEST LEAD TO THE HIGH VOLTAGE DC HIPOT SOURCE CAPABLE OF ACHIEVING A MINIMUM OF 160,000 VDC.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 10.15 CONTACT ENGINEERING AT THIS POINT TO WITNESS THE HIGH VOLTAGE TESTING.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>33 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

**NOTE: USE EXTREME CAUTION WHEN AROUND HIGH VOLTAGE, FOLLOW ALL POSSIBLE PRECAUTIONS AND LAB GUIDELINES.**

10.16 TURN THE DC HIPOT POWER ON.

OPERATOR INITIALS:\_\_\_\_\_ DATE:\_\_\_\_\_

**NOTE: THE VOLTAGE INCREASE WILL BE PERFORMED AS QUICKLY AS POSSIBLE TO SIMULATE AN INSTANTANEOUS HIGH VOLTAGE APPLICATION.**

10.17 RAMP THE VOLTAGE UP AS QUICKLY AS POSSIBLE UNTIL BREAKDOWN OCCURS. ENSURE THAT THE BREAKDOWN VOLTAGE IS RECORDED FOR THE RAPID RAMP THAT IS PERFORMED. IF THE COMPONENT DOES NOT FAIL DURING THE RAPID RAMP, MAINTAIN THE MAXIMUM VOLTAGE THAT THE HIPOT CAN SUPPLY AND RECORD THE TIME IT TAKES TO BREAKDOWN AT THAT VOLTAGE. RECORD THESE VALUES IN TABLE 12.

OPERATOR INITIALS:\_\_\_\_\_ DATE:\_\_\_\_\_

10.18 DE-ENERGIZE THE TEST ASSEMBLY.

OPERATOR INITIALS:\_\_\_\_\_ DATE:\_\_\_\_\_

10.19 REMOVE THE TEST ASSEMBLY FROM THE OIL BATH AND REMOVE THE PIN FROM ITS FIXTURE. ENSURE THAT THE NUMBERING SYSTEM ON THE PINS IS STILL CLEARLY LEGIBLE. SET ASIDE THE PINS FOR FUTURE INSPECTION.

OPERATOR INITIALS:\_\_\_\_\_ DATE:\_\_\_\_\_

10.20 REPEAT STEP 10.7 THROUGH 10.19 FOR PINS 2, 7, AND 8. RECORD ALL VALUES AND COMMENTS IN TABLE 12.

| TABLE 12 – RAPID VOLTAGE RAMP RESULTS |                                      |                                                    |          |
|---------------------------------------|--------------------------------------|----------------------------------------------------|----------|
| PIN<br>NUMBER                         | PEAK<br>VOLTAGE<br>OBTAINED<br>(VDC) | TIME TO<br>FAILURE AT<br>PEAK VOLTAGE<br>(MINUTES) | COMMENTS |
| 1                                     |                                      |                                                    |          |
| 2                                     |                                      |                                                    |          |
| 7                                     |                                      |                                                    |          |
| 8                                     |                                      |                                                    |          |

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>34 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

10.21 SUBMIT THE TABLE 12 RESULTS TO THE PROJECT ENGINEER BEFORE MOVING FORWARD IN THIS PROCEDURE.

OPERATOR INITIALS:\_\_\_\_\_ DATE:\_\_\_\_\_

ENGINEER: \_\_\_\_\_ DATE:\_\_\_\_\_

10.22 OBTAIN THE PINS THAT HAVE NOT BEEN TESTED FOR DC VOLTAGE BREAKDOWN YET (3 THROUGH 6 AND 9 THROUGH 12).

OPERATOR INITIALS:\_\_\_\_\_ DATE:\_\_\_\_\_

10.23 ENSURE THAT THE REMAINING PINS HAVE BEEN PREPARED AS PINS 1, 2, 7 AND 8 HAVE BEEN PREPARED (STEP 10.7 THROUGH 10.13).

OPERATOR INITIALS:\_\_\_\_\_ DATE:\_\_\_\_\_

10.24 RECORD THE REQUIRED LONG TERM VOLTAGE VALUES PROVIDED BY THE PROJECT ENGINEER. RECORD THESE VALUES IN TABLE 13 AND ENSURE THAT THE PROJECT ENGINEER HAS SIGNED THIS STEP TO APPROVE THE WRITTEN VALUES.

| <b>TABLE 13 - ASSIGNED LONG TERM BREAKDOWN VOLTAGE<br/>VALUES</b> |                                 |                                        |
|-------------------------------------------------------------------|---------------------------------|----------------------------------------|
| <b>PIN NUMBER</b>                                                 | <b>TARGET TEST<br/>DURATION</b> | <b>REQUIRED HOLD VOLTAGE<br/>(VDC)</b> |
| 3, 4, 9, 10                                                       | 48 HOURS                        |                                        |
| 5, 6, 11, 12                                                      | 336 HOURS                       |                                        |

OPERATOR INITIALS:\_\_\_\_\_ DATE:\_\_\_\_\_

ENGINEER: \_\_\_\_\_ DATE:\_\_\_\_\_

**NOTE: FAILURE TO OBTAIN THE PROJECT ENGINEERS SIGNATURE FOR THIS STEP BEFORE MOVING THE NEXT STEP WILL VOID THIS QUALIFICATION TEST.**

SUBJECT: **HIGH POWER NAUTILUS ELECTRICAL  
STEM ENGINEERING QUALIFICATION**

Effective Date

1-29-08

Document No.

**166318**

Revision

**A**

Page

35 of 39

Reference

QTP-309-40

Class

40

- 10.25 FOR PINS 3, 4, 9, 10 AND PINS 5, 6, 11, 12, RAMP THE VOLTAGE (VDC) TO THE APPROPRIATE VALUE REQUIRED IN TABLE 13 (STEP 10.24) AND MAINTAIN IT UNTIL THE COMPONENT FAILS. RECORD THE HOLD VOLTAGE AND THE START DATE AND TIME IN TABLE 14. CONTACT THE ENGINEER AND ADVISE HIM/HER OF THE MAINTAINED VOLTAGE VALUES AND THE START TIME OF THE TEST.

| TABLE 14 - LONG TERM VOLTAGE TEST START INFORMATION |            |                          |                 |
|-----------------------------------------------------|------------|--------------------------|-----------------|
| MINIMUM TEST DURATION (HOURS)                       | PIN NUMBER | MAINTAINED VOLTAGE (VDC) | START DATE/TIME |
| 48                                                  | 3          |                          |                 |
|                                                     | 4          |                          |                 |
|                                                     | 9          |                          |                 |
|                                                     | 10         |                          |                 |
| 336                                                 | 5          |                          |                 |
|                                                     | 6          |                          |                 |
|                                                     | 11         |                          |                 |
|                                                     | 12         |                          |                 |

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 10.26 PHOTOGRAPH THE PINS DURING TESTING.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 10.27 CONTINUOUSLY RECORD THE VOLTAGE AND TIME THROUGHOUT THE TEST. TAKE VOLTAGE AND TIME READINGS THREE TIMES A DAY, RECORDING THE VALUES IN THE TABLE IN APPENDIX A. MAKE AS MANY COPIES AS NEEDED FROM APPENDIX A TO ADEQUATELY CAPTURE THE REQUIRED INFORMATION. INSPECT THE PINS AND VOLTAGE METER WHILE TAKING READINGS TO ENSURE THAT THE TEST IS PROPERLY MAINTAINED. CONTINUE THIS PROCESS UNTIL THE PINS FAIL.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

- 10.28 AS SOON AS 48 HOURS ELAPSE, CONTACT AND INFORM THE PROJECT ENGINEER ON THE STATUS OF PINS 3, 4, 9, 10. IF THE PINS HAVE NOT YET FAILED, MAINTAIN THE TESTING CONDITIONS UNTIL THE PINS FAIL.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

SUBJECT: **HIGH POWER NAUTILUS ELECTRICAL  
STEM ENGINEERING QUALIFICATION**

Effective Date

1-29-08

Document No.

**166318**

Revision

**A**

Page

36 of 39

Reference

QTP-309-40

Class

40

10.29 NOTE THE TIME OF FAILURE FOR PINS 3, 4, 9, 10 IN TABLE 15.

**TABLE 15 - PIN 3, 4, 9, 10 BREAKDOWN VOLTAGE RESULTS**

| PIN NUMBER | MAINTAINED VOLTAGE<br>VALUE (VDC) | DATE/TIME OF FAILURE |
|------------|-----------------------------------|----------------------|
| PIN 3      |                                   |                      |
| PIN 4      |                                   |                      |
| PIN 9      |                                   |                      |
| PIN 10     |                                   |                      |

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

10.30 AS SOON AS 14 DAYS ELAPSE, CONTACT AND INFORM THE PROJECT ENGINEER ON THE STATUS OF PINS 5, 6, 11, 12. IF THE PINS HAVE NOT YET FAILED, MAINTIAN THE TESTING CONDITIONS UNTIL THE PINS FAIL.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

10.31 NOTE THE TIME OF FAILURE FOR PINS 5, 6, 11, 12 IN TABLE 16.

**TABLE 16 - PIN 5, 6, 11, 12 BREAKDOWN VOLTAGE RESULTS**

| PIN NUMBER | MAINTAINED VOLTAGE<br>VALUE (VDC) | DATE/TIME OF FAILURE |
|------------|-----------------------------------|----------------------|
| PIN 5      |                                   |                      |
| PIN 6      |                                   |                      |
| PIN 11     |                                   |                      |
| PIN 12     |                                   |                      |

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>37 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

11.0 **POST TESTING INSPECTION:**

11.1 BEFORE PROCEEDING ANY FURTHER, CONTACT THE PROJECT ENGINEER. THE PROJECT ENGINEER MUST BE PRESENT PRIOR TO PROCEEDING ANY FURTHER IN THE PROCEDURE. THE PROJECT ENGINEER MUST SIGN THIS STEP TO VALIDATE HIS/HER PRESENCE FOR THIS POST TEST INSPECTION.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

ENGINEER INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

11.2 CAREFULLY REMOVE THE BOOT SEALS AND BLADDERS FROM THE PINS. ENSURE THAT EACH BOOT SEAL AND BLADDER IS BAGGED AND MAINTAINED WITH THE PIN THAT THEY WERE ASSOCIATED WITH.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

11.3 REMOVE THE PINS FROM THE PARTIAL DISCHARGE TEST FIXTURES.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>38 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

11.4 VISUALLY INSPECT THE INDIVIDUAL COMPONENTS AND ANNOTATE ANY OBSERVATIONS ON TABLE 17.

| TABLE 17 - POST TEST INSPECTION COMMENTS CONCERNING INDIVIDUAL STEM COMPONENTS |               |          |
|--------------------------------------------------------------------------------|---------------|----------|
| MINIMUM<br>TEST<br>DURATION<br>(HOURS)                                         | PIN<br>NUMBER | COMMENTS |
| 48                                                                             | 3             |          |
|                                                                                | 4             |          |
|                                                                                | 9             |          |
|                                                                                | 10            |          |
| 336                                                                            | 5             |          |
|                                                                                | 6             |          |
|                                                                                | 11            |          |
|                                                                                | 12            |          |

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

11.5 BAG THE PINS, BOOT SEALS AND BLADDERS, CAREFULLY MAINTAINING THE NUMBERING, AND SUBMIT THEM TO THE PROJECT ENGINEER FOR FURTHER EVALUATION.

OPERATOR INITIALS: \_\_\_\_\_ DATE: \_\_\_\_\_

|                                                                                   |                           |                               |                      |
|-----------------------------------------------------------------------------------|---------------------------|-------------------------------|----------------------|
| SUBJECT: <b>HIGH POWER NAUTILUS ELECTRICAL<br/>STEM ENGINEERING QUALIFICATION</b> | Effective Date<br>1-29-08 | Document No.<br><b>166318</b> | Revision<br><b>A</b> |
|                                                                                   | Page<br>39 of 39          | Reference<br>QTP-309-40       | Class<br>40          |

## **APPENDIX A:**

|          |           | APPLIED VOLTAGE (VDC) |          |          |          | INITIALS |
|----------|-----------|-----------------------|----------|----------|----------|----------|
|          | Date/Time | Pin ____              | Pin ____ | Pin ____ | Pin ____ |          |
| Day ____ |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
| Day ____ |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
| Day ____ |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
| Day ____ |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
| Day ____ |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
| Day ____ |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
| Day ____ |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
| Day ____ |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
| Day ____ |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
| Day ____ |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
| Day ____ |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
| Day ____ |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
| Day ____ |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |
|          |           |                       |          |          |          |          |