SUBJECT: **STRAIN TO FAILURE QUALIFICATION TEST PROCEDURE FOR HIGH POWER NAUTILUS PINS**

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1.0 PURPOSE:

THIS QUALIFICATION TEST PROVIDES A MEANS OF ACCURATELY CAPTURING STRAIN TO FAILURE DATA WITH A RAPID RAMP TEST AND TWO DIFFERENT DURATION LONG-TERM HOLDS AT DIFFERENT CONSTANT STRAIN VALUES. THE DATA POINTS FROM THESE TESTS MAY LATER BE EXTRAPOLATED AND USED FOR PIN LIFE PREDICTION. THIS TEST DATA CAN BE USED TO GAIN A STRESS/STRAIN LIFE CURVE FOR AN ESTIMATED OPERATIONAL LIFE OF 25 YEARS USING STATISTICAL WEIBULL ANALYSIS. ADDITIONALLY, THIS TESTING IS BASED ON LESSONS LEARNED FROM **D/N 135594** (ENG-727-20), “HIGH POWER NAUTILUS CONNECTOR EPOXY PIN FAILURE INVESTIGATION”.

2.0 MATERIALS NEEDED:

- **D/N 75879** (SOP-085-39) DIGITAL IMAGE NAMING CONVENTION PROCEDURE
- **D/N 122511** (SOP-108-39) STANDARD OPERATING PROCEDURE TO PREPARE THE MTS LOAD FRAME FOR USE
- **D/N 122512** (SOP-109-39) STANDARD OPERATING PROCEDURE TO CALIBRATE LOAD CELLS USED ON MTS LOAD FRAME
- **D/N 122517** (SOP-113-39) STANDARD OPERATING PROCEDURE FOR EXPORTING DATA FROM MTS LOAD FRAME
- **D/N 167337** STRAIN GAGE INSTALLATIONS WITH M-BOND 200 ADHESIVE
- **P/N 1050973**(FIX-1157-01) HIGH POWER PIN STRESS FIXTURE ASSEMBLY
- **P/N 1047261**(HPR-244-01) HIGH POWER PLUG ELECTRICAL STEM(S)
- **P/N 1049485**(HPR-201-01) 3-WAY HP PLUG BASE
- **P/N 1049497**(HPR-202-01) 3-WAY HIGH POWER BACKUP PLATE
- **P/N 1050887**(HPR-262-01) HP PIN STRAIN FIXTURE(S)
- DIGITAL CAMERA
- MTS DATA LOGGER (FOR LOAD, DEFLECTION, TIME)
- MTS LOAD FRAME
- STRAIN GAGES (ONE FOR EACH PIN TESTED) AND SUPPORT EQUIPMENT FOR INSTALLING THE STRAIN GAGES
- STRAIN GAGE DATA LOGGER (FOR STRAIN VS. TIME)
- STRAIN GAGE METER
- ENVIRONMENTAL TEMPERATURE RECORDED/THERMOMETER

3.0 REFERENCE DOCUMENT:

- **D/N 135594** (ENG-727-20) INVESTIGATION SUMMARY REPORT

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.

4.0 **DOCUMENTATION:**

4.1 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: _____

4.2 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: _____

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

EQUIPMENT TYPE	ODI ID NUMBER	LAST CALIBRATION DATE	NEXT CALIBRATION DATE
MTS LOAD CELL			
STRAIN GAGE METER			
TORQUE WRENCH			
MTS CROSSHEAD SPEED			
MTS CROSSHEAD DISPLACEMENT			

OPERATOR INITIALS: _____ DATE: _____

4.4 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: _____

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

OPERATOR INITIALS: _____ _____ DATE: _____

5.0 **STRAIN GAGE INSTALLATION:**

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

5.1 IF NOT ALREADY DONE, MARK EACH PIN USING A PERMANENT MARKER WITH A NUMERICAL SYSTEM TO MAINTAIN ORDER OF THE PINS.

OPERATOR INITIALS:_____ _____ DATE:_____

5.2 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:_____

_____

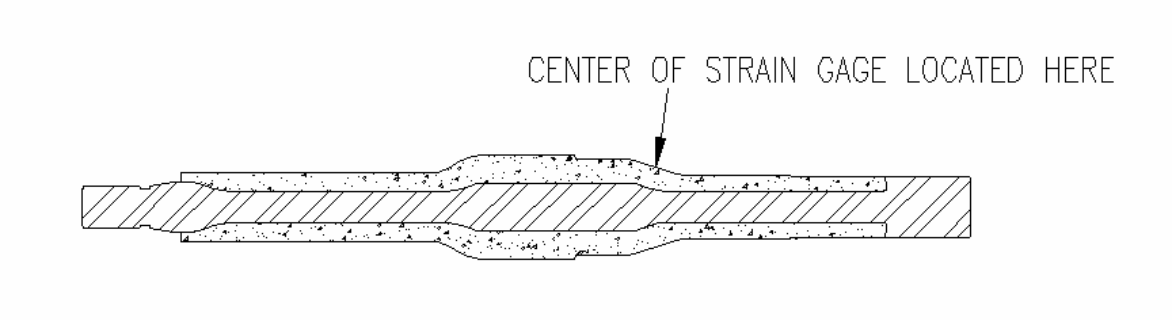
_____

_____

_____

OPERATOR INITIALS:_____ DATE:_____

5.3 INSTALL ONE STRAIN GAGE TO EACH PIN PER **D/N 167337**, LOCATING IT PER THE FIGURE BELOW (CENTER OF THE STRAIN GAGE APPROXIMATELY ON THE CENTERPOINT OF THE SLOPE):



OPERATOR INITIALS: _____ ____ DATE: _____

6.0 RAPID STRAIN RATE TEST PREPARATION:

6.1 INITIATE AND WARM UP THE MTS PER **D/N 122511** (SOP-108-39). WARM UP AND CALIBRATE THE MTS LOAD CELL PER **D/N 122512** (SOP-109-39). SET THE MTS TO RUN (AT THE START OF THE TEST) AT A RATE OF 0.02 IN/MIN CONTINUOUSLY UNTIL FAILURE OCCURS. SET THE LOAD LIMITS AND EXTENSION LIMITS OF THE MTS TO:

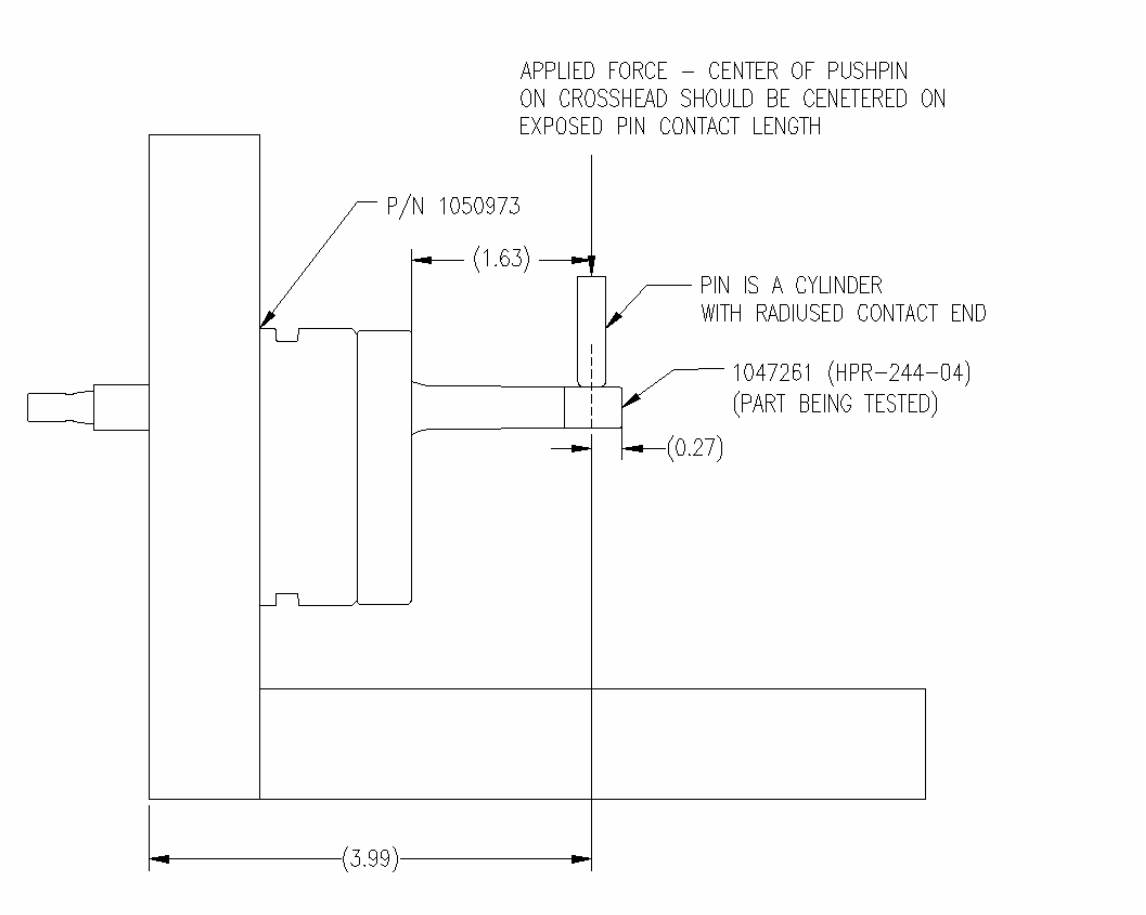
LOAD LIMIT HIGH: 450 lb
LOAD LIMIT LOW: -450 lb
EXTENSION LIMIT HIGH: 1.50 in
EXTENSION LIMIT LOW: -1.50 in

OPERATOR INITIALS: _____ _____ DATE: _____

6.2 ENSURE THAT THE OUTPUT WIRES FOR THE STRAIN GAGE(S) ARE PROPERLY CONNECTED TO THE STRAIN GAGE METER. WARM UP THE STRAIN GAGE METER FOR A MINIMUM OF 30 MINUTES. SET UP THE STRAIN GAGE METER APPROPRIATELY, TAKING A READING AT ITS FASTEST SAMPLING RATE OF 1 READING PER SECOND.

OPERATOR INITIALS: _____ _____ DATE: _____

6.3 MOUNT THE "L" PORTION OF P/N 1050973 (BASE PLATE AND MOUNTING PLATE BOLTED TOGETHER) SECURELY ONTO THE MTS LOAD FRAME USING 1/4-20 SOCKET HEAD CAP SCREWS, POSITIONING IT SO THAT THE LOAD IS APPLIED TO THE PIN TIP (REFER TO THE FIGURE BELOW FOR PROPER ORIENTATION). TORQUE THE 1/4-20 SOCKET HEAD CAP SCREWS TO 30±5 IN.LBS. INSTALL P/N 1049485 (3-WAY HP PLUG BASE) INTO THE "L" PORTION OF THE ASSEMBLY WITH THREE ¼"-20 X 1 INCH LONG SOCKET HEAD CAP SCREWS. TORQUE THESE 1/4-20 SOCKET HEAD CAP SCREWS TO 30±5 IN.LBS. REFER TO THE FIGURE BELOW FOR SET-UP REFERENCE (NOTE THAT THE CENTER OF THE CROSSHEAD WILL BE APPROXIMATELY 3.99 ± 0.05 INCHES FROM THE EDGE OF THE VERTICAL PLATE OF THE FIXTURE).



OPERATOR INITIALS:_____ _____ DATE:_____

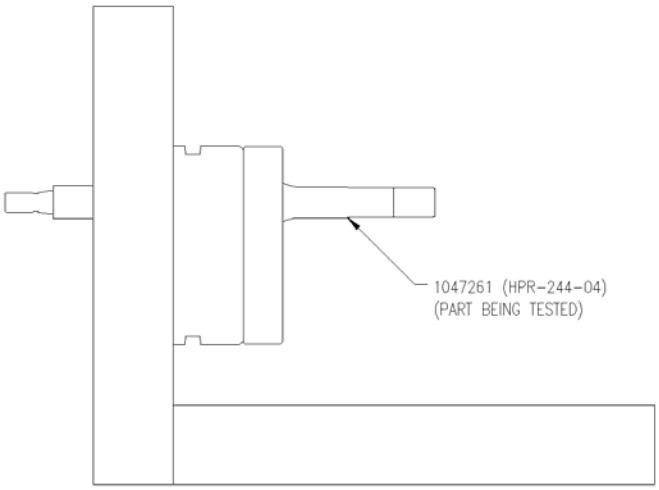
6.4 MOUNT THE APPROPRIATE FIXTURE TO THE MTS CROSSHEAD THAT WILL APPLY THE LOAD TO THE PIN.

OPERATOR INITIALS:_____ _____ DATE:_____

7.0 RAPID STRAIN RATE TEST PROCEDURE:

7.1 ENSURE THAT THE CROSSHEAD IS MOVED UP ENOUGH THAT IT IS OUT OF THE WAY DURING PIN INSTALLATION.

7.2 INSTALL THE PIN UNDER TEST INTO THE “L” PORTION OF THE TEST ASSEMBLY WITH THE STRAIN GAGE ORIENTED UP. REFER TO THE FIGURE BELOW TO VERIFY PROPER INSTALLATION. INSTALL P/N 1049497 (3-WAY HIGH POWER BACKUP PLATE) USING THREE 8-32 SOCKET HEAD CAP SCREWS. TORQUE EACH 8-32 SCREW TO 15±3 IN.LBS.



OPERATOR INITIALS:_____ _____ DATE:_____

7.3 MOVE THE CROSSHEAD DOWNWARD SO THAT THE LOADING FIXTURE SURFACE IS JUST ABOVE THE PIN SURFACE.

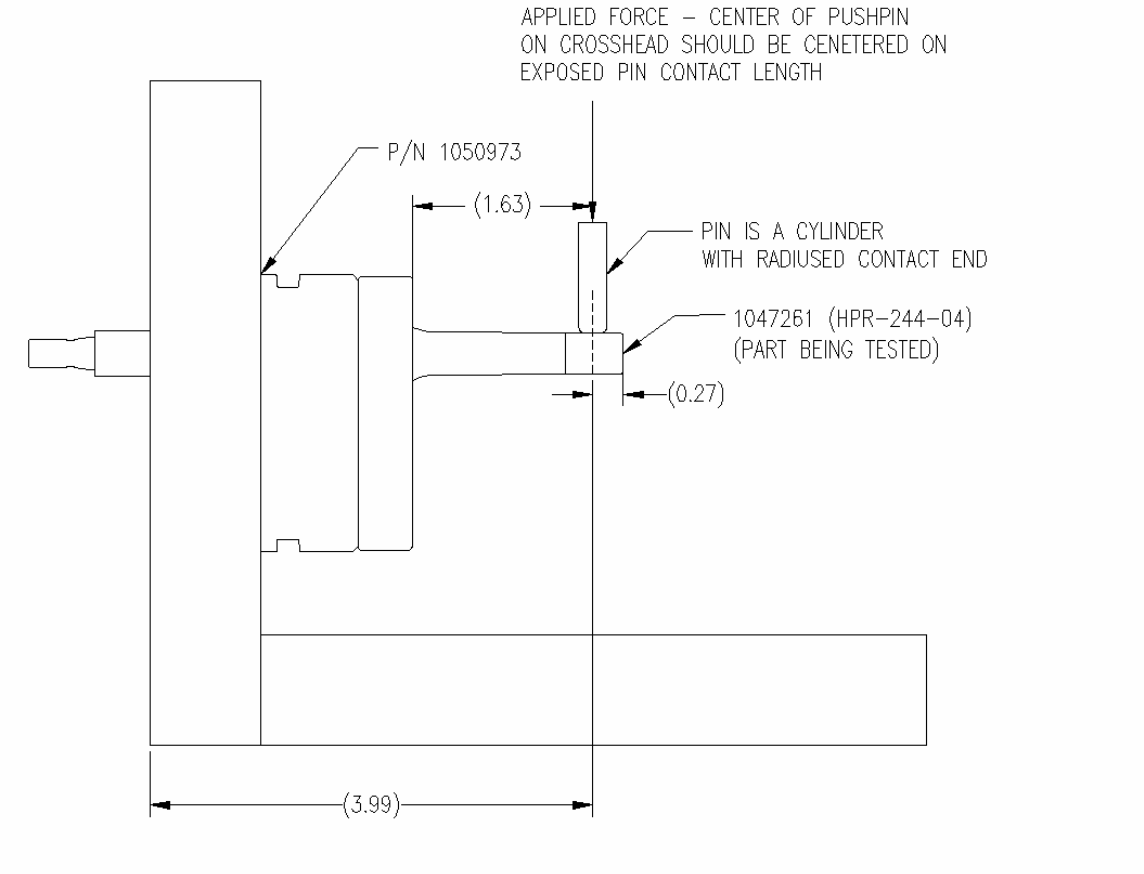
7.4 ENSURE THAT THE LOAD CELL HAS BEEN CALIBRATED AND ENSURE THAT THE LOAD METER DISPLAYS A ZERO VALUE.

OPERATOR INITIALS:_____ _____ DATE:_____

7.5 CAREFULLY BRING THE CROSSHEAD DOWNWARD WITH THE MANUAL OPERATION BUTTONS TO WHERE THE LOAD VALUE INCREASES SLIGHTLY (ENSURE THAT NO MORE THAN 0.5 LB IS OBSERVED). ZERO THE CROSSHEAD DISPLACEMENT METER.

OPERATOR INITIALS:_____ _____ DATE:_____

7.6 PHOTOGRAPH THE TEST SET-UP. THE TEST SET-UP SHOULD BE IDENTICAL TO THAT IN THE DIAGRAM BELOW. RECORD THE ENVIRONMENTAL TEMPERATURE IN °C IN TABLE A1 FOR THE PIN THAT IS BEING TESTED.



OPERATOR INITIALS:_____ _____ DATE:_____

7.7 ENSURE THAT THE STRAIN GAGE METER IS SET UP TO RECORD STRAIN DATA. START THE STRAIN DATA LOGGER AND IMMEDIATELY START THE TEST SEQUENCE ON THE MTS.

7.8 ENSURE THAT THE CROSSHEAD HAS STOPPED AS SOON AS IT IS NOTICED THAT THE PIN HAS FAILED (TYPICALLY IDENTIFIED BY A SIGNIFICANT DROP IN LOAD ON THE MTS LOAD METER/PLOT). RECORD THE FAILURE LOAD AND THE DEFLECTION AT THE FAILURE LOAD, THE PEAK MICROSTRAIN OBSERVED ON THE STRAIN GAGE METER AT THE POINT OF THE FAILURE LOAD, AND THE TIME THAT IT TOOK FOR THE PIN TO FAIL ON TABLE A1. ANY OTHER PINS THAT WILL BE TESTED IN THIS SECTION WILL BE RECORDED IN TABLE A1, IN APPENDIX A, AS WELL.

OPERATOR INITIALS:_____ _____ DATE:_____

7.9 REMOVE THE PIN FROM THE TEST FIXTURE. PERFORM A VISUAL INSPECTION ON THE PIN AND RECORD THE FAILURE LOCATION IN TABLE A2 IN APPENDIX A. PHOTOGRAPH THE FAILURE LOCATION.

OPERATOR INITIALS: _____ _____ DATE: _____

7.10 VERIFY THAT THE RAW STRAIN METER STRAIN DATA AND TIME HAS BEEN RECORDED AND SAVED. ENSURE THAT THE MTS SYSTEM RAW FORCE, CROSSHEAD DISPLACEMENT AND TIME HAS BEEN SAVED AND RECORDED.

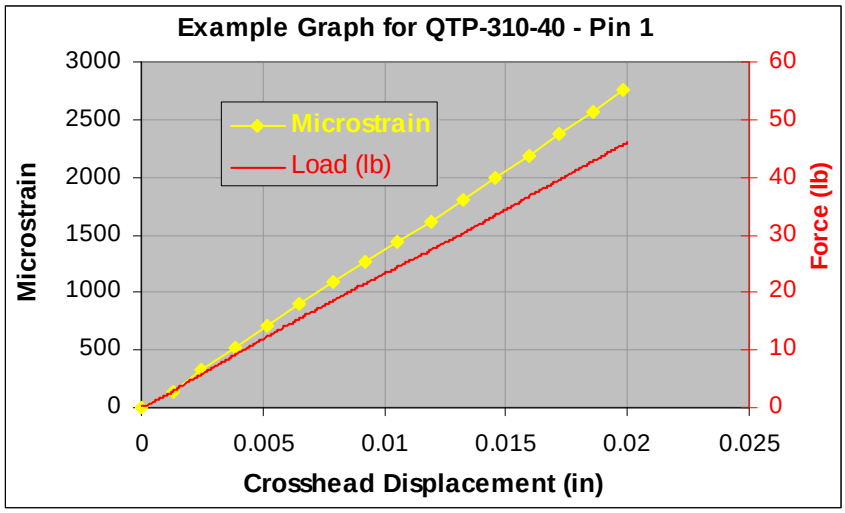
OPERATOR INITIALS: _____ _____ DATE: _____

7.11 EXPORT THE STRAIN METER RAW STRAIN AND TIME DATA TO AN EXCEL FILE AND SAVE THE FILE. EXPORT THE MTS RAW TIME, FORCE AND CROSSHEAD DISPLACEMENT DATA (**D/N 122517** (SOP-113-39) MAY BE USED FOR REFERENCE) TO THE SAME EXCEL FILE AND SAVE IT. TITLE THE EXCEL RAW DATA WITH THE OPERATORS NAME, DATE, TIME AND THE PIN NUMBER.

OPERATOR INITIALS: _____ _____ DATE: _____

7.12 PRODUCE A GRAPH SIMILAR TO THE GRAPH SHOWN BELOW FOR EACH PIN THAT IS TESTED.

NOTE: THE PLOT BELOW IS ONLY AN EXAMPLE FOR GRAPH GENERATION GUIDANCE. THE FAILURE STRAIN AND LOAD OF THE PINS BEING TESTED CAN BE SIGNIFICANTLY DIFFERENT IN MAGNITUDE THAN WHAT IS SHOWN IN THIS EXAMPLE.



OPERATOR INITIALS: _____ _____ DATE: _____

7.13 REPEAT STEPS 7.1 THROUGH 7.12 FOR EACH ADDITIONAL PIN THAT REQUIRES TESTING IN THIS MANNER. RECORD THE RESULTS FOR THE ADDITIONAL PINS IN TABLES A1 AND A2.

OPERATOR INITIALS: _____ ____ DATE: _____

INITIALS: _____ ____ DATE: _____

NOTE: BEFORE PROCEEDING ANY FURTHER, NOTIFY THE PROJECT ENGINEER OF THE RAPID RAMP TEST RESULTS. ANY LONG TERM STRAIN TEST PINS WILL NOT BE TESTED UNTIL THE PROJECT ENGINEER HAS REVIEWED THE RAPID RAMP RESULTS AND ASSIGNED A STRAIN VALUE TO THE TESTS BEYOND THIS POINT.

8.0 LONG TERM PIN STRAIN TEST PROCEDURE:

8.1 OBTAIN ONE EACH OF P/N 1050887 (HP PIN STRAIN FIXTURES) FOR EACH PIN TO BE TESTED IN THIS SECTION.

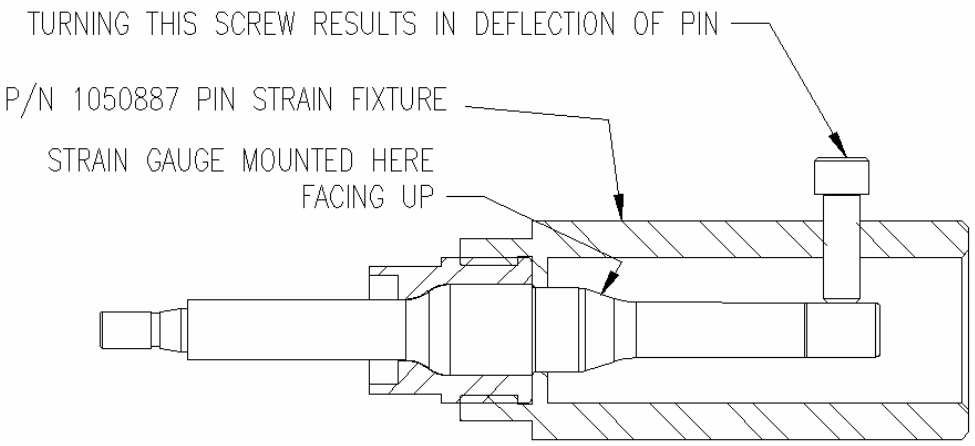
OPERATOR INITIALS:_____ ____ DATE:_____

8.2 RECORD THE REQUIRED MICROSTRAIN VALUES AND TARGET TEST DURATIONS PROVIDED BY THE PROJECT ENGINEER, IN WRITING, FOR THE LONG TERM TESTS IN TABLE B1 IN APPENDIX B. ENSURE THAT THE PROJECT ENGINEER HAS SIGNED EACH LINE WITH A WRITTEN PIN NUMBER, TEST DURATION AND MICROSTRAIN VALUE IN TABLE B1 TO APPROVE THOSE VALUES. PROVIDE THE ENGINEER WITH A COPY OF TABLE B1 PRIOR TO PROCEEDING TO THE NEXT STEP.

OPERATOR INITIALS:_____ DATE:_____

NOTE: FAILURE TO OBTAIN THE PROJECT ENGINEERS SIGNATURE FOR ANY PIN LISTED IN TABLE B1 BEFORE MOVING THE NEXT STEP WILL VOID THE QUALIFICATION TEST OF THAT PIN.

8.3 MOUNT EACH PIN, ALONG WITH ITS INSTALLED STRAIN GAGE, INTO ITS STRAIN FIXTURE (P/N 1050887). TIGHTEN THE STRAIN FIXTURE BASE INTO THE STRAIN FIXTURE SLEEVE UNTIL THE BASE BOTTOMS INTO THE SLEEVE. TORQUE THE STRAIN FIXTURE BASE INTO THE STRAIN FIXTURE SLEEVE TO A VALUE OF 15 ± 3 IN. LBS. ONCE ASSEMBLED, THE TYPICAL LONG TERM STRAIN ASSEMBLY SHOULD LOOK LIKE THE FIGURE BELOW, WITH THE EXCEPTION THAT THE SOCKET HEAD CAP SCREWS SHOULD NOT BE IN CONTACT WITH THE PIN AT THIS POINT.



OPERATOR INITIALS:_____ ____ DATE:_____

8.4 ENSURE THAT THE OUTPUT WIRES FOR THE STRAIN GAGES ARE PROPERLY CONNECTED TO THE STRAIN GAGE METER. IF NOT ALREADY DONE, WARM UP THE STRAIN GAGE METER FOR A MINIMUM OF 30 MINUTES. SET UP THE STRAIN GAGE METER APPROPRIATELY, TAKING 1 READING PER MINUTE.

OPERATOR INITIALS: _____ _____ DATE: _____

8.5 DEFLECT EACH PIN TO THE MICROSTRAIN VALUE REQUIRED IN TABLE B1 BY TURNING THE SOCKET HEAD CAP SCREW AGAINST THE PIN TIP UNTIL THE STRAIN METER HAS ACHIEVED THE REQUIRED VALUE. RECORD THE ACHIEVED VALUES IN THE TABLE B2 IN APPENDIX B. CONTACT THE ENGINEER AND ADVISE HIM/HER OF THE ACHIEVED VALUES AND THE START TIME OF THE TEST.

OPERATOR INITIALS: _____ _____ DATE: _____

8.6 PHOTOGRAPH THE INSTALLED PINS.

OPERATOR INITIALS: _____ _____ DATE: _____

8.7 CONTINUOUSLY RECORD THE STRAIN AND TIME THROUGHOUT THE TEST. TAKE STRAIN, TIME, AND ENVIRONMENTAL TEMPERATURE READINGS THREE TIMES A DAY, RECORDING THE DATA IN TABLE B2 IN APPENDIX B. MAKE AS MANY COPIES AS NEEDED OF TABLE B2 TO ADEQUATELY CAPTURE THE REQUIRED INFORMATION. INSPECT THE PINS AND STRAIN METER WHILE TAKING READINGS TO ENSURE THAT THE TEST IS PROPERLY MAINTAINED. ENSURE THAT THE STRAIN VALUE THAT WAS REQUIRED IN TABLE B1 IS MAINTAINED THROUGHOUT TESTING. THIS MAY REQUIRE SOME FINE ADJUSTMENT OF THE SOCKET HEAD CAP SCREWS IN THE TEST FIXTURE. CONTINUE THIS PROCESS UNTIL THE PINS FAIL. ***A FAILURE WILL BE MOST EASILY NOTED BY A SIGNIFICANT CHANGE IN STRAIN.***

OPERATOR INITIALS: _____ _____ DATE: _____

8.8 AS SOON AS THE TEST DURATION FOR A PARTICULAR PIN IN TABLE B1 ELAPSES, CONTACT THE PROJECT ENGINEER AND NOTIFY HIM/HER ON THE STATUS OF THE PINS PROJECTED TO FAIL BY THAT DURATION. IF THE PINS HAVE NOT YET FAILED, MAINTAIN THE TESTING CONDITIONS UNTIL THE PINS FAIL.

OPERATOR INITIALS: _____ _____ DATE: _____

8.9 NOTE THE TIME OF FAILURE FOR THE PINS IN THE TABLE B3 (APPENDIX B).

OPERATOR INITIALS: _____ _____ DATE: _____

9.0 LONG TERM STRAIN POST TESTING INSPECTION:

9.1 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: _____

9.2 REMOVE THE SOCKET HEAD CAP SCREWS THAT WERE DEFLECTING EACH PIN AND SET THEM ASIDE. REMOVE EACH STRAIN FIXTURE BASE AND PIN FROM EACH STRAIN FIXTURE SLEEVE.

OPERATOR INITIALS: _____ _____ DATE: _____

9.3 VISUALLY INSPECT THE PINS FOR THE FAILURE LOCATION. PHOTOGRAPH THE PINS AT THE FAILURE LOCATION AND COMMENT ON THE FAILURE LOCATION AND MODE IN TABLE B4 (APPENDIX B).

OPERATOR INITIALS: _____ _____ DATE: _____

9.4 BAG THE PINS, CAREFULLY MAINTAINING THE NUMBERING AND SUBMIT THEM TO THE PROJECT ENGINEER FOR FURTHER EVALUATION.

OPERATOR INITIALS: _____ _____ DATE: _____

APPENDIX A – RAPID RATE TEST DATA:

TABLE A1 – RAPID RAMP RATE STRAIN DATA

PIN NUMBER	FAILURE LOAD (LB)	DEFLECTION AT PEAK LOAD (IN)	PEAK MICRO STRAIN	TIME OF PIN FAILURE (SECONDS)	ENVIRONENT TEMP. (°C)	OPERATORS INITIAL	DATE

TABLE A2 – RAPID RAMP RATE STRAIN FAILURE LOCATIONS			
PIN NUMBER	**FAILURE LOCATION AND COMMENTS**	**OPERATORS INITIAL**	**DATE**

APPENDIX B – LONG TERM STRAIN TEST DATA:

TABLE B1 – ENGINEER APPROVED TEST DURATION AND STRAIN VALUES

PIN NUMBER	TARGET TEST DURATION	REQUIRED MICROSTRAIN	ENGINEER APPROVAL SIGNATURE	OPERATOR INITIALS	DATE

TABLE B2 – LONG TERM STRAIN TEST DATA

			MICROSTRAIN				
	Date/Time	**ENVIRONMENT TEMP. (°C)**	**Pin __**	**Pin __**	**Pin __**	**Pin __**	**OPERATOR INITIAL**
DAY 1							
DAY _____							
DAY _____							
DAY _____							
DAY _____							
DAY _____							
DAY _____							

TABLE B3 – FAILURE DATE/TIME OF LONG TERM PINS			
PIN NUMBER	**MICROSTRAIN VALUE**	**DATE/TIME OF FAILURE**	**OPERATOR INITIAL**

Page _____ of _____

TABLE B4 – LONG TERM STRAIN FAILURE LOCATIONS			
PIN NUMBER	**FAILURE LOCATION AND COMMENTS**	**OPERATOR INITIALS**	**DATE**