API Qualification of Ultrasonic Examiners for Sizing Examination Program (QUSE)

Candidate Orientation

September 2009

PURPOSE

The information in this handout is intended to provide an outline for the API Qualification of Ultrasonic Sizing Examiners (QUSE) Certification Program. This handout is intended to provide a brief overview for each Test Candidate/Candidate Organization regarding test administration and candidate preparation. The information contained with this handout is subject to change; therefore, all candidates will receive an additional orientation by the PDA (Performance Demonstration Administrator) prior to the start of each qualification session.

Sizing Examination Test Protocol

All candidate Crack Sizing demonstrations are scheduled to be completed during a single eight-hour workday (0800 –1700). A one-hour lunch break will be available at the candidate's option. A defined security plan will be established during testing (including lunch and bathroom breaks) to prevent test sample compromise. **Only one test candidate will be allowed to leave the testing area at any time.**

The following projected time schedule is provided for candidate reference. The actual practical demonstration (test sample evaluation) times identified below can be affected as a result of candidate readiness. It is strongly recommended that candidate's become familiar with the qualification protocol, specifically the data reporting forms and examination procedure to increase efficiency.

0800 – 0830	Candidate orientation
0830 – 1000	Equipment Inventories and Calibration's
1000 – 1200	Crack Sizing Practical Demonstration
1200 – 1300	Lunch Break – In Room (optional)
1300 – 1600	Crack Sizing Practical Demonstration
1600 – 1700	Post demonstration paperwork and reporting

Each candidate will be given a unique test set consisting of 16 crack sizing qualification test specimens. Candidates must work independently and are not allowed to discuss specimen or examination information during or after the demonstration. In general, there will be no single sample time limit established, however, if a Test Sample requires sharing between 2 candidates, sample time limit provisions may be established.

All paperwork must be completed and turned into the monitor by end of day. Time extensions will not be authorized. Candidates that fail to complete the examination in the allotted time will be considered unsuccessful.

CRACK SIZING SPECIMEN PRESENTATION

Crack Depth information shall be concealed to maintain a "blind test". Test specimens will be given a unique identifier or alias. Test specimens are divided into 2 groups of thicknesses. There will be a group of specimens that are .375 inch (9.5 mm) thick and 1 inch (25.4 mm) thick specimens. There will be no disclosure of particular specimen results or candidate viewing of unmasked specimens during or after the performance demonstration.

TEST SET AND TEST SPECIMEN DESIGN

Each candidate will be supplied a list defining the test specimens that make up their test set. Each test set will be comprised of the following samples:

Samples	1 - 8	.375 inches (9.5 mm) in nominal thickness
Samples	9 – 16	1.0 inches (25.4 mm) in nominal thickness

Some crack sizing test samples may be as welded and some may have the weld crowns ground flush.

All Cracks will be ID Connected Cracks at or near the weld root. No fabrication cracks (embedded) will be sized.

Specimen Geometry

1. The crack test sample will be an actual with root geometry.
2. Specimens will NOT contain counterbore geometry
3. The weld joint geometry or preparation will be a 30 degree weld prep bevel.
4. The ID of the Crack Sizing Test Sample will be masked

GRADING CRITERIA

Candidate performance will be evaluated as follows:

- All sixteen (16) crack sizing Test Samples will be evaluated.
- The entire length (approximately 2 inches) of the Test Sample shall be examined.
- The maximum depth shall be reported along the length of the crack.
- **The Grading Criteria is as follows:**
  - .375 inch thick samples:
    - 6 of the 8 samples shall be with + - 0.050 inches
    - 2 of the 8 shall not be greater than 0.100 inches
  - 1.0 inch thick samples:
    - 6 of the 8 samples shall be with + - .100 inches
    - 2 of the 8 shall not be great than 0.150 inches

There is no length sizing criteria's established at this time. Test Candidates are required to provide only crack depth information relating the through wall height in decimal inches, ***not remaining ligament*** of the ID connected Crack.

TEST SPECIMEN RE-LOOKS

The candidate may re-look any specimen they have completed provided they are within the time limits of the test.

RE-TESTING

Any unsuccessful candidate must apply to API for re-testing. Re-testing will be administered with the same rules and guidelines as the original test.

TEST RESULTS

Test results will not be given to candidates immediately upon completion of the demonstration. Testing paperwork will be reviewed at the end of the session for completeness and legibility. All grading will be done post session and forwarded to API for review and concurrence. Results will be forwarded from API to either the individual candidate or their organization.

Defined Crack Sizing Ultrasonic Procedure (API-UT-10)

Ultrasonic procedure API-UT-10 was developed during test specimen and test set validation (fingerprinting). This procedure defines the equipment and techniques that have been proven successful and efficient for crack depth sizing of the test specimens. Use of this procedure is not mandatory, however, it is strongly recommended.

If an alternate crack sizing procedure is used other than API-UT-10, then a copy shall be submitted with the API QUSE Examination data and shall become a part of the Test Candidates examination.

EQUIPMENT REQUIREMENTS

Test Candidates or candidate organizations are responsible for supplying **ALL** the equipment needed for each demonstration. This includes any special Crack Sizing Transducers or Probes, as well as any crack sizing calibration blocks. Sizing calibration blocks with known notch depths or side drilled holes (SDH) should be used to establish appropriate depth calibrations.

Sharing of equipment will not be allowed during the demonstration unless approved by the Test Administrator. Below is a recommended list of equipment and supplies that should be considered for use during the demonstration.

1. Ultrasonic Instrument
2. Ultrasonic Cables
3. Special Crack Sizing Ultrasonic Transducers/Search Units
4. Reference Standards (IIW, Rompas, DSC)
5. Crack Sizing Calibration Blocks
6. Calculator
7. Pens/Pencils

The Test Candidate should provide all couplant and rags.

REQUIRED PAPERWORK

All demonstration paperwork shall be completed on yellow paper to facilitate demonstration security requirements. Copying facilities will be available for candidates that arrive with pre-filled out inventory sheets or calibration records. It is requested that all pre-filled out paperwork be completed on white paper. No other paper or materials will be allowed at the testing station. The following demonstration paperwork will be required as a minimum;

Equipment Inventory

Ultrasonic instruments, search units, and other equipment essential to the examination system shall be inventoried and documented on the Equipment Inventory Sheet prior to the start of the qualification test. All non-inventoried equipment shall be stored in an area unrelated to the operation of the examination system. All subsequent inclusions of equipment for qualification purposes shall be documented on the sheet and verified by the Session Monitor. Blank inventory sheets are available on the website and can be completed prior to the demonstration, but will be verified prior to the start of the demonstration. If the make model, frequency, size or shape can not be readily determined the equipment certification should be on hand during the demonstration.

Calibration Data Sheet

Calibration data record(s) shall be completed for each crack sizing method. PDA staff will review all calibration data sheets to ensure that they contain sufficient information to properly document the equipment was used during the demonstration and to document procedure compliance. The calibration data sheet will not be used as a pass-fail criterion, but shall be evaluated to determine correlation between successful and unsuccessful candidates.

Crack Sizing Data Report Form

For each Test Sample, a crack height shall be recorded on the Crack Sizing Data Report Form. The candidate is responsible to ensure that all required fields are legibly filled out in their entirety.

SECURITY

1. Session Monitoring

   The demonstration will be monitored by the PDA. The PDA will consist of a Session Monitor. Continuous testing area surveillance will be maintained. Entry into and out of the testing area will be restricted. The testing area will be monitored during lunch to allow candidates additional time for testing if they choose not to take a lunch break.

   Purses, backpacks, or briefcases will not be allowed at the candidates testing stations. Additionally, no cellular telephones, personal pagers, or laptop computes will be allowed in the testing area. Personal items shall be stored in a location specified by the session monitor and will be secured to prevent theft or loss during testing.

2. Candidate Expectations

   Candidates are expected to adhere to the security rules as specified in this guideline. Candidates are not allowed to openly discuss information concerning the test samples or examination results. Any violations of the security rules may be cause for terminating the candidate's test and a failing grade to be posted.

3. Additional Security Rules

   Additional security measures will be implemented as necessary to ensure the integrity of the testing program. Additional security will be covered in the orientation portion of the demonstration.

4. Dispute Resolution

   A dispute resolution form will be available to document unresolved issues and concerns with the qualification program. Dispute resolutions will be forwarded to the API for comment and resolution.

FREQUENTLY ASKED QUESTIONS

1. What special transducers will be needed?

   A. These special crack sizing transducers are identified in General Crack Sizing Procedure API-UT-10. Other Special sizing transducers may be used with an appropriate Crack Sizing Procedure.

2. What special crack sizing calibration blocks will be needed?

   A. Crack sizing calibration blocks, which must be supplied by the Test Candidate, should contain known calibration reflectors such as side drilled holes and/or notches.

3. Is length sizing of the crack a requirement of the test.?

   A. No, only the through height of the crack is required.

4. Do I have to follow the defined procedure (API-UT-10)?

   A. No, the use of alternative techniques is allowable provided the methods and techniques are clearly identified in a procedure supplied to the Test Administrator. The use of the defined procedure (API-UT-10) is strongly recommended, as it has proven both successful and efficient in performing examinations on these samples. Calibration records and equipment inventory records will be used to record the equipment used.

5. Are all of the test sets similar?

   A. Yes. All crack sizing Test Samples and Test Sets have been ultrasonically validated. The degree of difficulty has been adjusted for fairness. The test sets do differ from sample to sample in the depths of the cracks. Each test set is equally challenging.

6. What happens if I do not finish the test in the prescribed time?

   A. Candidates that fail to complete the examination in the allotted time will be considered unsuccessful. Future attempts will require a complete re-test.

7. Is there anything beneficial I can do prior to the start of testing?

   A. Yes. Becoming familiar with this testing protocol document, the Crack Sizing Procedure API-UT-10 generic procedure, and all of the examination data records will be a great benefit. Additionally, inventory records may be filled out and calibrations may be performed and documented in advance on white paper. Copying facilities will be available to transfer these records onto yellow paper.

8. Is Advanced Crack Sizing Training a perquisite for taking the API Crack Sizing Examination?

   A. Although not a perquisite, it is strongly recommended that some sort of organized training in the Advanced Crack Sizing methods be obtained prior to the examination.

9. Do I have to provide proof of identity?

   A. Yes. A driver's license with picture or an equivalent proof of identification is necessary.

10. Can I leave the facility during lunch?

   A. No. Once testing has started the security requirements are put in place. Candidates are encouraged to bring lunch.