ISQ-O&G

Ultrasonic Testing Shear Wave Pressure Equipment Weld Examination Protocol

ASNT Certification Services LLC (ASNT CS)
Document O&G-UTSW-4
Revision 03

Revision	Date	Summary of Revisions
00	06/17/2020	Original document release
01	03/11/2021	Revised Section 10.0 Grading
02	12/02/2021	Added to document Scope. Revised Paragraph 5.5 to reflect current grading practice, revised Paragraph 8.3 to reflect current practice. LLC and logo changes to document.
03	11/09/2023	Revised the upstream/downstream diagram and the grading criteria.

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1.0 Scope

1.1. This protocol covers the requirements for the O&G ISQ qualification for NDT Ultrasonic Testing Shear Wave (UTSW) angle beam weld quality examination for carbon steel welds on ASME, or similarly governed, pressure equipment. The qualification covers the detection, characterization, and location of manufacturing weld discontinuities found in pressure equipment. Crack sizing is not included in this qualification. This qualification is only applicable to welds in carbon steel, type 304, type 316, and type 321 stainless steels. This ISQ qualification does not apply to phased array ultrasonic testing (PAUT), time of flight diffraction (TOFD), or to ultrasonic testing (UT) structural weld inspections. This ISQ qualification is referred to as the O&G-UTSW**.**

1.2. The applicable product forms for the O&G-UTSW include, but are not limited to: plate, piping, pressure vessels, storage tanks, and pipelines, etc. The applicable operating environments for the O&G-UTSW include, but are not limited to: refineries, chemical plants, pipelines, shipping terminals, marine transport, floating and fixed platforms, floating production and storage marine and hull facilities, liquefied natural gas facilities, equipment fabrication facilities, and plate and pipe mills, etc.

1.3. It is the intent of the ASNT ISQ UTSW angle beam weld quality examination qualification to demonstrate an acceptable level of technician competency to perform shear wave angle beam examinations on pressure equipment welds within the following parameters:

1.3.1. Low alloy and some stainless steels limited by thickness.

1.3.2. Material thickness from 0.250 in. to 3 in. (6.3.5 to 76.2 mm) nominal inclusive for low alloy carbon steels.

1.3.3. Material thickness from 0.250 in. to 1 in. (6.3.5 to 25.4 mm) nominal inclusive for 300 series stainless steels, when and where shear wave angle beam examination can be utilized.

Note: Thicker 300 series stainless steels and other corrosion-resistant steels that require refracted longitudinal angle beam examination are not covered by this qualification.

1.3.4. Curved surfaces from 2 in. (50.8 mm) diameter up to flat material.

1.3.5. Single-V and double-V weld configurations.

1.3.6. Welds containing the following common discontinuity types:

1.3.6.1. Cracks: axial and transverse

1.3.6.2. Lack of fusion: weld sidewall or weld root

1.3.6.3. Incomplete penetration

1.3.6.4. Slag inclusions

1.3.6.5. Porosity: clusters or lines

1.4. The qualification shall verify the UT technician’s competency in the following areas:

1.4.1. Ability to differentiate weld discontinuities from weld geometry reflectors such as weld reinforcement.

1.4.2. Ability to differentiate discontinuity types with the highest level of focus on differentiating planar discontinuities from volumetric discontinuities.

1.4.3. Ability to accurately measure location of discontinuities along a weld axis.

1.4.4. Ability to accurately measure discontinuity lengths.

1.4.5. Ability to accurately measure discontinuity locations within weld cross section and to differentiate surface-connected discontinuities from embedded discontinuities.

1.5. The ISQ UTSW angle beam weld quality qualification does not include the following list of factors:

Note: This is not an all-inclusive list and other situation-specific factors can affect UTSW angle beam weld quality testing. Equipment owners and operators should make considerations for the following scenarios that may affect UTSW weld quality examinations including application-specific training, procedures, and appropriate samples for procedure validation.

1.5.1. Clad and weld overlay materials with potential disbonds and/or cracking between materials.

1.5.2. Detection and evaluation of advanced damage mechanisms such as HIC, SOHIC, SCC, HTHA, etc.

1.5.3. UTSW examinations at elevated or cryogenic temperatures

1.5.4. UTSW examinations through thermal spray aluminum (TSA) coating

1.5.5. UTSW examinations of non-metallics

1.5.6. UTSW examinations of exotic corrosion-resistant alloys such as Inconel, Super Duplex, etc.

Note: The ISQ exam evaluates technician ability to accurately measure discontinuities within the ranges listed in this protocol and is not considered an accuracy limitation of UTSW *measurement equipment.*

2.0 References

2.1. The following documents are referenced herein and are considered supporting documentation for this protocol. Unless otherwise specified below, refer to the latest edition of the referenced documents.

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2.2. ASNT Certification Services LLC Documents

2.2.1. **ASNT Recommended Practice No. SNT-TC-1A:** *Personnel Qualification and Certification in Nondestructive Testing Personnel*

2.2.2. **ANSI/ASNT CP-189:** *Standard for Qualification and Certification of Nondestructive Testing Personnel*

2.2.3. **UT-PTP8** Manual Ultrasonic Shear Wave ASME Weld Quality Examination

2.2.4. **AEC-1** AEC Program Document Requirements

2.2.5. **QP-ISQ-2** Industry Sector Qualification Oil & Gas Program

2.2.6. **AEP-1** Authorized Examination Proctor (AEP)

2.2.7. **AEP-2** AEP Examination Administration at Remote Locations

2.3. Industry Codes and Standards

2.3.1. **International Organization for Standardization (ISO)**

2.3.1.1. **ISO9712:** *Non-destructive testing – Qualification and certification of NDT personnel*

2.3.2. **American Society of Mechanical Engineers (ASME)**

2.3.2.1. ***ASME Boiler & Pressure Vessel Code****,* Section V: *Nondestructive Examination*, Article 4, *Ultrasonic Examination Method for Welds*

2.3.3. **ASTM International**

2.3.3.1. **ASTM E164 –** *Standard Practice for Contact Ultrasonic Testing of Weldments*

3.0 Acronyms

3.1. **AEC–**Authorized Examination Center

3.2. **AEP–**Authorized Examination Proctor

3.3. **ANSI–**American National Standards Institute

3.4. **API–**American Petroleum Institute

3.5. **ASME–**American Society of Mechanical Engineers

3.6. **ASNT–**American Society for Nondestructive Testing

3.7. **ASNT CS–**ASNT Certification Services LLC

3.8. **ASTM–**ASTM International

3.9. **BPVC–***ASME Boiler & Pressure Vessel Code*

3.10. **CMC–**Certification Management Committee

3.11. **HAZ–**Heat-Affected Zone

3.12. **ID–**Inside Diameter (opposite scanning surfaces)

3.13. **ISQ–**Industry Sector Qualification

3.14. **NDT–**Nondestructive Testing

3.15. **OD–**Outside Diameter (scanning surfaces)

3.16. **O&G–**Oil & Gas

3.17. **UTSW–**Ultrasonic Testing Shear Wave

4.0 Definitions

4.1. **ASNT CS Certification Department:** The ASNT CS Certification Department is responsible for the administration and facilitation of ASNT CS certification programs in accordance with procedures developed by the ASNT CS CMC.

4.2. **Authorized Examination Center (AEC):** An organization with facilities and personnel, independent of the NDT technician's employer that has been authorized and approved by the ASNT Certification Services LLC Certification Management Committee (CMC) to administer NDT qualification examinations.

4.3. **Authorized Examination Proctor (AEP):** An individual who has been authorized and approved by the ASNT CS CMC and ASNT CS Certification Department to administer NDT qualification examinations at an AEC or an approved remote examination location.

4.4. **Candidate:** An individual seeking qualification in accordance with this document.

4.5. **Certification Management Committee (CMC):** The ASNT CS committee that has the overall responsibility for developing and maintaining the technical content of all ASNT CS certification programs and shall have the sole responsibility for the determination of certification outcomes in those programs.

4.6. **Industrial Sector (IS):** A specific area in industry or technology where specialized NDT practices are utilized requiring specific skill, knowledge, equipment, or training to achieve satisfactory performance.

4.7. **Industry Sector Qualification (ISQ):** A qualification program where performance demonstration examinations are given to NDT technicians for specific NDT techniques applicable to a given IS, assessing competency in performing examinations. The ISQ qualification shall be awarded to a candidate upon successful passing of the performance examinations.

4.8. **Qualification:** As it pertains to the ISQ program, within this document and elsewhere, qualification refers to the verification of competency in a given method and technique through hands-on performance demonstration testing. It does not refer to the use of the word "qualification" as it pertains to NDT certification.

4.9. **ISQ Steering Committee:** The group of O&G owner/operator subject matter experts responsible for the development and maintenance of the ISQ program that fairly and equitably represents the interests of all parties significantly concerned with the ISQ- O&G scheme without any particular interest predominating. The parent committee is the ASNT CS CMC over the O&G owner/user steering committee for the ISQ-O&G program.

4.10. **Test Sample:** A sample of a product form containing known discontinuities used in practical examinations.

5.0 Responsibilities

5.1. The test samples, procedures, grading criteria, test keys, and other confidential information relating to this program shall be maintained confidentially with the ASNT CS Certification Department and approved by review from the CMC ISQ O&G Steering Committee.

5.2. All examination applications shall be processed through the ASNT CS Certification Department and shall meet the requirements established within this procedure.

5.3. All test samples shall be fingerprinted to establish the truth data for exam grading keys.

5.4. Examinations shall only be administered by ASNT CS AECs utilizing AEPs, or at ASNT CS authorized remote sites utilizing AEPs that meet the requirements for the AEC-1 document and ISQ-O&G program as established by the steering committee.

5.5. Grading shall not be conducted at the AECs or remote examination sites by AEPs. Hard copy exams shall be utilized and shall be sent back to ASNT CS by the AEC or AEP. This will be completed utilizing either email or fax, where the exams will be graded directly by the ASNT CS Certification Department. Results notification will be sent by email on an expedited basis within five (5) business days.

6.0 Examination prerequisites

6.1. All O&G-UTSW candidates shall apply to ASNT CS through the ASNT CS website.

6.2. All O&G-UTSW candidates shall understand that the expected prerequisite level of competency to sit for this exam is at least equal to a UT Level II certification per the guidelines in SNT-TC-1A.

6.3. All O&G UTSW candidates shall have first successfully passed the ASNT CS O&G-UTT qualification. This is a one-time prerequisite.

6.4. Guidance on the method of ultrasonic weld examination techniques can be found in *ASME BPVC,* Section V: *Nondestructive Examination*, Article 4 and ASTM E164.

6.5. Candidates shall present a color digital photo along with a unique email address as part of their application. Photos must be a passport or government-issued license-style headshot. Photos may be taken on devices such as personal digital cameras, cell phones, or webcams. The image format shall be .jpg, .gif, or .png.

6.6. At the examination center or remote examination location, the AEP will match the name on the

candidate's identification to the name in the system (candidate's name as it appears on their ASNT account. The name on the candidate's identification must match exactly, ***no exceptions.*** If the candidate's ASNT account name does not match the name on their identification, they must contact ASNT CS as least 72 hours prior to the exam in order to get their record updated.

6.6.1. Identification Requirements:

6.6.1.1. The first and last name that the candidate uses to register must match exactly the first and last name on any identifications presented on exam day.

6.6.1.2. All required identifications must be issued by the country in which the candidate is testing. If the candidate does not have a qualifying primary identification issued from the country they are testing in, an international travel passport from their country of citizenship is required, along with a secondary identification.

6.6.1.3. Candidates are required to present ***original*** (no photocopies or digital identifications), ***valid*** (unexpired) identifications; one form as a primary identification (government issued with name, recent recognizable photo, and signature) and one form as a secondary identification (with at least a name and signature, or name and recent recognizable photo) if requirement in 6.6.1.2 is not met. See table below for reference.

PRIMARY IDENTIFICATION			SECONDARY IDENTIFICATION
International travel passport Driver's license Military identification (including spouse and dependents) Identification card (national/state/province identity card)	Alien registration card (green card, permanent resident, visa) Local language identification (not in Roman characters) – accepted only if issued from the country the candidate is testing in		Any identification containing at least name and signature, or name and recognizable photo that meets above identification requirements

6.6.2. Additional Identification Allowances:

6.6.2.1. Expired forms of identification are not acceptable unless accompanied by valid renewal papers.

6.6.2.2. If a government-issued identification is missing a visible signature, or has an embedded signature, the candidate will be allowed to test if the other requirements for primary and secondary identifications are met.

7.0 Examination questions

7.1. UTSW discontinuity plotting exam questions shall be acquired through development by ISQ Oil & Gas Steering Committee or CMC members.

7.2. All discontinuity plotting questions shall be evaluated by three (3) ASNT CS certified UT Level III technicians from the CMC and/or ISQ Oil & Gas Steering Committee to establish the truth data for the examination keys. At least one (1) of the three (3) shall be a technical member of the

steering committee.

7.2.1. Discontinuity plotting data from all three (3) of the UT Level IIIs fingerprinting results shall be compared for evaluation. Data for each exam question from each of the Level IIIs shall be within the grading tolerances for the three (3) data sets. If there is a data point outside of this tolerance, the three (3) Level IIIs will look at the question and answers to determine the cause for the data discrepancy. If the issue can be resolved and agreed by all three (3) Level IIIs, the exam question will be used with the agreed upon answer. Resolution might come through modification of the exam question to produce consistent results. If the three (3) Level IIIs cannot reach consensus, as detailed above, the discontinuity plotting question will be removed from the UTSW program.

7.3. Discontinuity plotting questions should be created in accordance with the following guidance:

7.3.1. Weld detail parameters:

7.3.1.1. Thickness range should be from 0.5 in. to 2 in. (12.7-50.8 mm)

7.3.1.2. For double-V welds, the center of the root location should be the midpoint of the base material thickness.

7.3.1.3. The weld root gap should be from 1/8 in. (0.125 in.) to 3/16 in. (0.187 in.) (3.18-4.75 mm) for base metal <1 in. (25.4 mm) and from 3/16 in. (0.187 in.) to 5/16 in. (0.312 in.) (4.75-7.92 mm) for base metal $\geq$1 in (25.4 mm).

7.3.1.4. The weld root face should be from 0 in. to 3/16 in. (0.187 in.) (0-4.75 mm) for root gaps $\leq$3/16 in. (0.187 in.) (4.75 mm) and from 3/16 in. (0.187 in.) to 5/16 in. (0.312 in.) (4.75-7.92 mm) for root gaps $\geq$3/16 in. (0.187 in.) (4.75 mm).

7.3.1.5. The weld bevel angle should be from 25 to 45° for base metal <1 in. (25.4 mm) and from 35° to 45° for base metal $\geq$1 in. (25.4) For double-V welds, the angle should be the same for the lower angle and the upper angle.

7.3.2. Discontinuity detail parameters:

7.3.2.1. Discontinuities shall be in locations that correspond with real world discontinuity locations, such as what are used on the sample scanning exam section. Examples include weld toe cracks, root cracks, HAZ cracks, lack of side wall fusion, slag inclusions, etc.

7.3.2.2. Upstream and downstream shall be used to indicate which side of the weld the indication is detected/drawn from.

7.3.2.3. Surface distance shall indicate the surface distance from the transducer wedge index point (sound emission point) to the weld centerline. In general, the surface distance should be from 1.5 in. to 6 in. (38.10-152.40 mm)

7.3.2.4. Sound path shall be appropriate to match the other parameters and place the defect in the weld area or HAZ. Sound paths should only plot discontinuities in the first or second leg of sound.

8.0 Examination test samples

8.1. Test Samples – All O&G-UTSW examination samples shall be evaluated with conventional shear wave angle beam ultrasonics by at least three (3) ASNT CS certified UT Level III technicians from the CMC and/or the Oil & Gas Steering Committee to establish the truth data for the examination keys. All O&G-UTSW examination samples shall also be evaluated with an advanced ultrasonic shear wave angle beam technique that provides encoded and recorded data; allowable methods for this are PAUT, full matrix capture, and/or TOFD. Note that the advanced methods are utilized only for a data record to be used for reference; the exam keys will be created solely by the conventional shear wave angle beam fingerprinting.

8.2. All equipment used for truth data collection and evaluations shall be calibrated with traceability to national standards.

8.3. All examination test sample discontinuities shall be assigned a difficulty rating value at time of truth data determination. This value shall be initially established by the CMC Level IIIs determining the sample truth data. These values shall be in the range of 0.3 to 0.95 (30 to 95%) representing the expected percentage of UT technicians who would be able to correctly evaluate the specific discontinuity in question.

8.4. ASNT CS may complete reviews of the pass/fail statistics for the UTSW samples to evaluate the current difficulty ratings of samples in the database. If significant variations are observed during these reviews, the ISQ Oil & Gas Steering Committee will decide what action, if any, shall be taken.

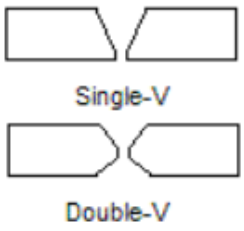
8.5. Examination sample sets shall be made up of a group of discontinuities that the cumulative difficulty rating value is in the range of 0.5 to 0.8, 50% to 80% pass rates from statistics gathered. This process shall assist with ensuring comparable difficulty across all UTSW exam sample sets.

8.6. Material of test samples shall be low alloy-type carbon steel.

8.7. Wall thickness of test samples shall be within the range from 0.250 to 1.5 in. (6.35 to 38.10 mm).

8.8. UTSW test samples may be of either flat plate or curved section product form. Curved section samples should not have a radius smaller than that of an ANSI 6 in. (152.40 mm) OD pipe and weld length to be a minimum of 12 in. (304.80 mm) for all samples.

8.9. Test samples may have single-V or double-V preparation welds in them.



8.10. Curved samples shall only contain circumferential girth welds.

8.11. The number of test samples per the ISQ O&G-UTSW exam shall be four (4).

8.12. Discontinuities on test samples may be natural or artificial.

8.13. Test samples shall contain discontinuity types from the following list:

8.13.1. Weld toe crack (OD or ID)

8.13.2. Root crack on ID (circumferential or axial)

8.13.3. HAZ crack (circumferential or axial)

8.13.4. Embedded centerline crack

8.13.5. Lack of sidewall fusion

8.13.6. Sidewall crack

8.13.7. Lack of root fusion

8.13.8. Incomplete penetration

8.13.9. Slag Inclusion

8.13.10. Porosity

8.14. Individual test samples shall contain a number of discontinuities within the range from zero (0) to five (5).

8.15. Test samples shall be free of coating.

8.16. Test samples shall have a 0-datum position clearly marked. For location purposes, this is the position all discontinuities shall be measured from. The 0-datum position mark shall also detail the direction of travel from the datum, so it is clear which direction to measure from on full pipe sections.

8.17. All test samples shall be uniquely identified by an appropriate permanent marking method to ensure traceability for each sample. Such marking shall not interfere with the practical examinations of the test samples and shall be concealed from candidates with alternative identification marking while the test samples are being used for examinations.

8.18. Test samples shall have an identified and clearly marked upstream and downstream side of each weld. The upstream or downstream side of each weld shall be referenced when identifying the cross-sectional location of any discontinuities reported.

8.19. There shall be a master test sample examination key report maintained by the ASNT CS Certification Department Staff.

8.20. All test samples shall have a cover attached to the backside surface (opposite scanning surface) to mask any discontinuity types present on the test samples.

8.21. Test samples shall have a maximum number of uses during examinations at any given AEC or

region. When the maximum number of exposures is reached at any given location or region, the test samples shall be either sent back to ASNT CS or to another AEC or region and be replaced with other O&G-UTSW samples from the test sample pool for that AEC or region. The test sample shall then be utilized at other AEC or regional location(s) and not sent back to the AEC with the maximized number of exposures until the replacement issued sample to the initial AEC has met its maximum number of exposures.

9.0 Examinations

9.1. Examination guidelines and the examination procedure, UT-PTP8, shall be made available to the technicians before the examination, and can be found at any time through the ASNT CS website.

9.2. The examination guidelines and UT-PTP8 should be read and understood before a candidate applies for an examination. The candidate shall be expected to follow the examination guidelines and UT-PTP8 during the examination. Failure to do so may cause a failure on the exam.

9.3. Candidate shall successfully complete three (3) out of the four (4) required drawings to pass the discontinuity plotting portion of the exam.

9.3.1. Candidate shall receive credit for the discontinuity plot drawings if the weld is drawn correctly and the discontinuity is located in the appropriate grading zone. Grading zone criteria for discontinuity locations shall be +/-0.125 in. (3.18 mm) for weld plots with wall thickness $\leq$1 in. (25.4 mm) and +/-0.25 in. (6.35 mm) for weld plots >1 in. (25.4 mm) wall thickness.

9.3.2. Candidate's ability to draw an accurate scale drawing of the weldment from the dimensions provided and draw the discontinuity location from the UT details provided, will directly affect their success on the discontinuity plotting questions.

9.4. The candidate shall have a maximum of six (6) hours to complete the sample scanning portion of the examination, including calibration time, examination of four (4) test samples, and filling out all paperwork. For computerized examinations, additional time shall be allowed for electronic data entry and submission of the examination report; however, no access to the test samples shall be allowed after the six (6) hour timeframe has passed.

9.5. Questions may be asked to the AEP only. Specific questions about the exam content shall not be answered.

9.6. Each test sample shall be examined to determine the presence and type of any discontinuities in the weldment, HAZ, and adjacent base material by scanning the entire sample weld. Possible discontinuity types are detailed above in Paragraph 8.13. The discontinuities detected that meet or exceed the reporting level threshold value, detailed in the examination guidelines and UT-PTP8, shall be recorded and reported.

9.7. The location from datum to the start of each discontinuity shall be recorded and reported.

9.8. The length of each discontinuity shall be recorded and reported.

9.9. The cross-sectional locations of discontinuities in the weld samples shall be recorded and reported.

9.9.1. The cross-sectional location of each discontinuity recorded shall be reported as one of the possible options listed on the report form, such as:

9.9.1.1. OD weld toe (upstream or downstream)

9.9.1.2. ID weld toe (for double-V weld preparations, upstream or downstream)

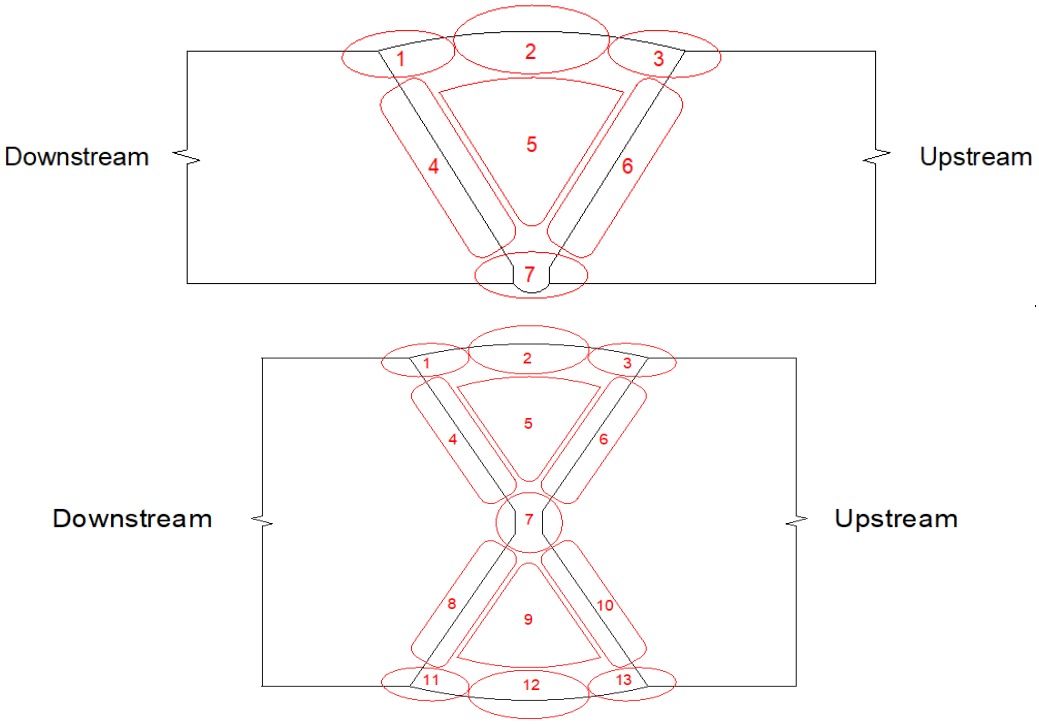
9.9.1.3. ID weld centerline (root for single-V weld preparations and ID cap center for double-V weld preparations)

9.9.1.4. Midwall weld fusion face/zone (upstream or downstream)

9.9.1.5. Midwall weld centerline

9.9.1.6. OD weld centerline (cap)

9.9.2. The cross-sectional location of any given discontinuity shall be reported by selecting the appropriate identified zone from a drawing such as the examples below:



9.10. These data reporting requirements, items 8.5 through 8.8 above, may be pull-down menu type selection lists on computerized exams.

10.0 Examination grading

10.1. Discontinuity Plotting Exam

10.1.1. Candidates shall be provided fictional details required to create plot drawings of welds, and ultrasonic indications within those weld drawings. The weld plot drawings shall be graded against the established criteria. Successful completion of the weld discontinuity plot drawing component of the exam is required to successfully pass the O&G ISQ UTSW exam.

10.1.2. Candidate shall receive credit for the discontinuity plot drawings if the weld is drawn correctly and the discontinuity is located in the appropriate grading zone. Grading zone criteria for discontinuity locations shall be +/-0.125 in. (3.18 mm) for weld plots with wall thickness <1 in. (25.4 mm) and +/-0.25 in. (6.35 mm) for weld plots >1 in. (25.4 mm) wall thickness.

10.1.3. Candidate shall successfully complete three (3) out of the four (4) required drawings to pass the discontinuity plotting portion of the exam.

10.2. Sample Scanning Exam

10.2.1. A candidate shall be graded on indication plotting, discontinuity detection, discontinuity characterization, discontinuity location (distance from 0-datum), discontinuity length sizing, and cross-sectional placement of discontinuities. Discontinuity length sizing is graded separately from detection, characterization, location, and cross-sectional placement.

10.2.2. Detection and characterization grading on the exam is comprised of three (3) categories that are separated into two (2) columns on the grading table in Paragraph 10.8. Column 1 covers missed discontinuities and incorrect calls and Column 2 covers false calls. The three (3) categories are defined in Paragraphs 10.6.1 through 10.6.3.

10.2.3. The following errors will count against a candidate on their exam grading:

10.2.3.1. Missed Discontinuity–candidate failed to detect a discontinuity in the location where a discontinuity exists.

10.2.3.2. Incorrect Call-candidate incorrectly characterized a discontinuity type or incorrectly positions and/or sizes a discontinuity.

10.2.3.2.1. For the purpose of incorrect calls, a candidate will receive credit if calling a discontinuity within the same discontinuity-type group as long as the discontinuity location, length, and zone information is correct. The two discontinuity-type groups are planar discontinuities and volumetric discontinuities.

10.2.3.2.1.1. Planar discontinuities consist of all cracks, lack of fusions, and incomplete penetration.

10.2.3.2.1.2. Volumetric discontinuities consist of slag inclusions and porosity.

10.2.3.2.2. If a candidate calls a discontinuity in an incorrect location distance from datum it will be considered an incorrect call. In order to get credit for a discontinuity distance from datum, the recorded start position shall be within +/-0.5 in. (12.7 mm) of the actual start position.

10.2.3.2.3. If a candidate calls a discontinuity in an incorrect cross-sectional position (zone), Paragraph 9.9.2 above, then it will be considered

an incorrect call.

10.2.3.2.4. Discontinuity lengths that are reported by the candidate to be considerably shorter or longer than the actual discontinuity length will be graded as an incorrect call on their exam. The allowable discontinuity reported length tolerances to receive credit for the discontinuity length are:

10.2.3.2.4.1. For discontinuities ≤0.5 in. (12.7 mm) in actual length, the allowable tolerance for length sizing is two (2 ×) times the actual discontinuity length, and the allowable undersizing is 1/2 (50%) of the actual discontinuity length.

10.2.3.2.4.2. For discontinuities >0.5 in. (12.7 mm) in actual length, the allowable tolerance for length sizing is the actual discontinuity length +0.5 in. (12.7 mm) and the allowable undersizing is the actual discontinuity length –0.5 in. (12.7 mm).

10.2.3.3. False Call–candidates call a discontinuity where no discontinuity exists.

10.2.4. Candidates shall not incur multiple errors from a single discontinuity, i.e., an incorrectly characterized discontinuity that is oversized shall not be graded as an incorrect call twice.

10.2.5. Discontinuity length sizing on the exam is graded separately and contained in Table 2 in Section 10.2.6.

10.2.6. The grading criteria in Table 1 shall be applied to the candidate's reporting for the entire sample set;

TABLE 1

Discontinuity Detection and Characterization Grading		
COLUMN 1 Missed Discontinuities and Incorrect Calls (characterization, distance from datum, and zone)	COLUMN 2 False Calls	SCORE
1	0	Pass
2	0	Pass
0	1	Pass
0	2	Pass
1	1	Pass
1	2	Pass
2	1	Pass
2	2	Fail
3	0	Fail

TABLE 2

Discontinuity Sizing (Lengths) Grading	
COLUMN 1 Missed Length	SCORE
1	Pass
2	Pass
3+	Fail

Must pass both parts to pass exam.

10.2.7. Candidates shall be allowed to retake the exam per the retake requirements detailed in the QP-ISQ-2 program document.

11.0 Qualification Validity

11.1. Candidates who successfully pass the O&G-UTSW exam shall be qualified for a period of three (3) years from the date they receive notification of qualification.

11.2. ASNT CS may withdraw or revoke ISQ credentials if the performance or ethics of the technician does not meet ASNT CS requirements at any time during the validity period.

12.0 Authorized Examination Centers

12.1. Only ASNT CS AECs or ASNT CS approved locations shall be utilized for the administration of ISQ-O&G exams. Specific requirements for AECs can be found in the ASNT CS AEC-1 document.

13.0 Authorized Examination Proctors

13.1. Only ASNT CS approved AEPs shall be utilized for the administration of ISQ-O&G exams. Specific requirements for AEPs can be found in the ASNT CS AEP-1 and 2 documents.

14.0 Conflict Resolution

14.1. Candidates shall submit any inquiries or conflicts, among the ISQ documents or program, in writing, to ASNT CS for resolution.