

API Std 1104 Interpretations - Welding of Pipelines and Related Facilities

Last update: May 2024

Standard	Edition	Section	Inquiry #	Question	Response
1104	20	1	10052	<p>Background: Paragraph 1 of the 21st Ed. of API 1104 and of the 22nd Ed. of API 1104 states: "...While this standard is comprehensive, it may not address all issues that may arise. The absence of guidance or requirements is not to be considered prohibitive to a particular activity or approach that is based upon sound engineering judgment. For example, other industry standards, reliable engineering tests and analyses, or established industry practices may provide useful reference to establish sound engineering judgment."</p> <p>Paragraph 1 of API 1104 20th edition, October 2005, (including errata/addendum (July 2007) and errata 2 (2008)) and API 1104 21st Ed. does not include a statement as for what can or should be done in the absence of guidance or absence of specific requirements.</p> <p>Question: For the 20th edition, October 2005, (including errata/addendum (July 2007) and errata 2 (2008)) of API 1104 is the absence of guidance or requirements within this edition considered prohibitive to a particular activity or approach that is based upon sound engineering judgement?</p>	No.
1104	21	3	1104-I-1119-15	<p>Background: There is no interpretation or definition in API 1104 on what is a "hot pass" and its limitations. A hot pass is a pipeline terminology for the subsequent welding pass after the root pass is completed. This hot pass is used to burn off any impurities from the root pass. This is usually considered a singular pass and not should be used for buildup in a weld joint. My interpretation is that what a fill weld application is used for.</p> <p>Question: Is a hot pass limited to one pass or can it be used multiple times in the buildup in a weld joint?</p>	"Hot pass" is a term not used in the API 1104 Standard and therefore API has no basis on which to formulate a Response.
1104	21	3.1	1104-I-0309-18	<p>Background: A customer says one cannot reject a HAZ crack in radiography since it is not stated in the API 1104 Standard.</p> <p>Question: Are HAZ cracks acceptable if found with NDE?</p>	No. Section 3.1 refers to AWS A3.0 for definitions. Refer to AWS A3.0 definition of "weld crack" which includes the HAZ.

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1104	21	3.1.3	1104-I-1122-17	<p>Background: Section 3.1.3 the definition of Branch Weld was modified to read "Completed groove AND/or fillet weld joining a set-on or set-in branch fitting to a run pipe." In paragraph 5.8.1 figure 10 is referenced as joint designs as the joint designs for fillet welds. One of the designs in figure 10 is a branch connection.</p> <p>Question: Is it the intent of the code to have branch welds qualified using both a groove weld specimen AND a fillet weld specimen to meet the AND portion of the new definition or can a branch connection be qualified using a single fillet weld specimen as outlined in 5.8.1 and Figure 10?</p>	There is not enough detail to effectively respond to this question.
1104	21	3.1.7 & 5.3.2.8	1104-I-0308-17	<p>Question: Can I weld a pipe fixed horizontal position and go by turning and continue welding in fixed position according to 3.1.17 and 5.3.2.8, although the WPS was described in a fixed position without rotating, keeping all other variables acceptable?</p>	Yes.
1104	21	4.2	1104-I-0625-16	<p>Background: Base material P11C Procedure qualification test coupon is API 5L Gr. X65 pipe to same pipe, qualification done as per API 1104, base metal Specification and grade in WPS is "API-5L-Grade X65 through ASTM A 859 Gr. A Cl.2, WPHY X65", company representative rejected WPS due to dissimilar material like Pipe -API-5L-Grade X65 is P 1 where as Flange grade-ASTM A 859 Gr. A Cl.2 is P11C .</p> <p>Question: Can we weld Group "C" materials with same group, where impact test requirements are not required do we have refer P no's also?</p>	API is unable to provide a response because ASTM A859, "Standard Specification for Age- Hardening Alloy Steel Forgings for Pressure Vessel Components" is not within the scope of API 1104 (see Section 1) which states this standard only applies to carbon and low alloy steels.
1104	21	4.2.3.2	1104-I-0108-19	<p>Background: Gas mixers are currently utilized and have been utilized for many decades to blend shielding gases at many fabrication sites. They are commercially available and satisfy the blend tolerances required by AWS A5.32 Specification for Welding Shielding Gases.</p> <p>Question: Does 4.2.3.2 prohibit the use of commercially available gas mixers manufactured to blend pure gases into gas mixtures for welding?</p>	No.

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1104	21	5	1104-I-1116-15	<p>Background: A WPS was qualified as per API Standard 1104 requirements. The joint design as stated in the WPS is a combined J-Groove Butt.</p> <p>Question: Is it acceptable to use a joint design (Configuration) term combined J-Groove Butt as per the requirements of API 1104?</p>	Yes, provided that the requirements in API 1104, Sections 5.3.2.4 and 5.4.2.3 are satisfied.
1104	21	5	1104-I-1122-15	<p>Background: I have 2 difference pipes consisting of 1) Diameter 12" , 17.44 mm Wall thickness , Grade API 5L X52, and 2) Diameter 12", 21.43 mm Grade API 5L B From the above, I have to weld unequal wall thickness and SMYS.</p> <p>Questions:</p> <ol style="list-style-type: none"> 1. Could I use PQR which pipe Diameter 12", 17.44 mm Grade API 5L X52 for production weld? 2. Could I use PQR which pipe Diameter 12", 20 mm Grade API 5L X52 for production weld? 3. Could I use PQR which pipe Diameter 12", 9.5 mm Grade API 5L X52 for production weld? 4. Could I use PQR (Unequal wall thickness) which pipe Diameter 12", 9.5 mm Grade API 5L X52 welding with Diameter 12", 20 mm Grade API 5L X52 for production weld? 5. Could I use PQR (Unequal wall thickness and SMYS) which pipe Diameter 12", 9.5 mm Grade API 5L X52 welding with Diameter 12", 20 mm Grade API 5L B for production weld? 6. Could I use PQR (Unequal wall thickness and SMYS) which pipe Diameter 12", 9.5 mm Grade API 5L B welding with Diameter 12", 20 mm Grade API 5L X52 for production weld? 	<p>Yes, any one of the 6 PQRs could support a WPS that could be written to cover the wall thickness and material combination listed in the background.</p> <p>However, please reference API 1104, Section 5.4.2.2 Note 1. Note that API presumes the questions "Could I use..." is applied to the material combination listed in the background.</p>
1104	21	5	1104-I-1127-15	<p>Question: It is allowed to use of a Standard Welding Procedure Specification (SWPS) of AWS under the requirements of API 1104?</p>	No

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1104	21	5	1104-I-0104-19	<p>Background: We have a pre qualified WPS with one layer of E7016 uphill followed by E9045 downhill as second and consecutive layers.</p> <p>Question: If we add one more layer of E7016 uphill during production, does this violate the requirements of the API 1104 specification?</p>	Yes. Conformance to the WPS is required per 1104. Based on the information provided, you would not be following the qualified WPS which appears to limit use of E7016 to a single layer.
1104	21	5 Table 1	1104-I-0111-19	<p>Background: A welding procedure qualified as per API 1104 with SMAW process, bevel fillet weld (branch connection), root pass with cellulosic electrodes (Table 1 Group 1, E7010) and low hydrogen electrodes (Table 1 Group 3, e.g. E7018-1) used for the remaining passes.</p> <p>Question: Can this qualified welding procedure be used to support a new WPS for production welds under SMAW process for non-bevel lap fillet weld, using just electrodes (Table 1 Group 1, E7010) for root and remaining passes without changes of other essential variables?</p>	No.
1104	21	5	1104-I-1112-19	<p>Background: For welding procedure qualification, we are looking for the range of qualification for heat input in Sections 5 (Manual and Semiautomatic Welding) and 12 (Automatic welding with filler metal addition). Only Annex A, A.3.2 note q) states that the reference of $\pm 10\%$ from the nominal value registered during the welding of the test coupon.</p> <p>Question: Does this mean that if a welding procedure is qualified according to Section 5 or 12, and Annex A is not used, there is no limitation for minimum and maximum values for the heat input?</p>	Yes.

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1104	21	5	1104-I-0313-17	<p>Background: I have a question about weld continuity for API weld tests, specifically SMAW 6010 all the way out downward progression on pipe in the 6g position. I see the same welders from utility companies and the city re-certifying every 6 months to the same procedure and qualification. I have been told by a CWI that it is a requirement of the API to recertify no matter how often you weld to that code, which it just simply expires at 6 month intervals. Therefore you must take a practical assessment and weld another coupon.</p> <p>Question 1: Is it the same as other weld standards where within 6 months you can perform a weld to the procedure and qualification and remain certified in that process?</p> <p>Question 2: Is re-certifying every 6 months to the same procedure an API code requirement or is it at the employer's discretion?</p> <p>Question 3: Can we use continuity to remain certified past 6 months?</p>	<p>Response 1: No</p> <p>Response 2: No</p> <p>Response 3: Continuity is not specifically addressed by this Standard.</p>
1104	21	5	1104-I-1211-19	<p>Question 1: Does API 1104 allow the use to two separate groove qualified welding procedures with the same groupings of diameters and thicknesses be used in a single weld joint?</p> <p>Question 2: Can I use the manual GTAW procedure to weld the root and hot pass and then use my GTAW orbital procedure for the fill and cap on a single weld joint?</p>	<p>Response 1: No</p> <p>Response 2: No</p>

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1104	21	5	8264	<p>Background: The requirement stated in 10.2.3 a, 10.2.3 b do not address the situation where Welding procedure will be utilized for the first repair of welds originally produced with same welding procedure. For example, a diameter 56 in. joint of thickness 25 mm welded with combination of welding procedure GTAW/SMAW identified with repair such as slag and incomplete root fusion is not requiring separate procedure. The welding procedure used to complete welding was qualified to API 1104, Section 5, in addition with the hardness verification.</p> <p>Question 1: When welding procedure is qualified to API 1104, Section 5, in addition with the hardness verification, is this correct to say that a separate procedure is not required for the weld that subjected to be repaired with same procedure that was utilized to produce original weld?</p> <p>Question 2: When welding procedure is qualified to API 1104, Section 5, is it correct to say that a separate procedure is not required for the weld that subjected to be repaired with same procedure that was utilized to produce original weld?</p> <p>Question 3: Is it correct to say that Section 10.2.3 applies to the conditions specified in 10.2.3 a, b, c?</p>	<p>Response 1: Yes; with prior company authorization, first-time repairs of defects other than cracks may be repaired using the original welding procedure qualified to Section 5. Hardness testing is not required for a Section 5 procedure.</p> <p>Response 2: Yes; with prior company authorization, first time repairs of defects other than cracks may be repaired using the original welding procedure qualified to Section 5.</p> <p>Response 3: This question is unclear; therefore API cannot provide a response.</p>

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1104	20	5.1 5.4	10057	<p>Background: Paragraph 5.1 states " Before production welding is started, a detailed procedure specification shall be established and qualified to demonstrate that welds with suitable mechanical properties (such as strength, ductility and hardness) and soundness can be made by the procedure. These procedures shall be adhered to except where a change is specifically authorized by the company, as provided for in 5.4."</p> <p>Paragraph 5.4 states that a welding procedure must be re-established as a new procedure specification and must be completely requalified when any of the essential variables listed in 5.4.2 are changed . . .</p> <p>Interpretation 1104-I-0225-16: Question: Is it acceptable to author multiple welding procedures under one primary PQR? Response: Yes</p> <p>Question:</p> <p>1) Is it required to write a welding procedure prior to performing a qualification test weld?</p> <p>2) Can a qualified welding procedure be written based on the results recorded from a qualification test weld? I.e. after the qualification test weld data is created and recorded?</p> <p>3) Is it acceptable to author multiple welding procedures based on one primary qualification test record?</p> <p>3a) Is it acceptable to author multiple welding procedures based on one primary qualification test record with different specified essential variables without performing a new qualification test?</p> <p>3b) For example: Can a new procedure be written from an existing qualification record with a higher preheat than the procedure that was originally written from the same qualification test record to create a new more conservative procedure without creating a new qualification test record?</p> <p>4) Can multiple existing qualification test records be used in combination to support the drafting of a new welding procedure with wider essential variable ranges than either individual test record could support independently?</p>	<p>1. No 2. Yes 3. Yes 3 (a) Yes 3 (b) Yes 4. Yes</p>

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1104	21	5.1	1104-I-1117-17	<p>Background: In Section 5.1, Procedure Qualification- "Before production welding is started, a detailed welding procedure specification shall be established and qualified to demonstrate that welds with suitable mechanical properties (such as strength, ductility, and hardness) and soundness can be made by the procedure. The quality of the welds shall be determined by destructive testing."</p> <p>Question: Is it correct to use a PQR issued following a previous edition of API 1104 to support a new WPS based on the 21st edition?</p>	<p>This topic is not explicitly addressed in API 1104.</p> <p>NOTE: A PQR must conform to the requirements for the WPS based on the applicable 1104 edition,</p>
1104	21	5.1	1104-I-0120-19	<p>Background: Base material API 5L X65 qualification done as per 5.1 of API 1104 considering suitable mechanical destructive test (i.e. Tensile, Bend, Nick break, Hardness, Impact). Impact test done at -18°C as per API 1104. A company wants to use the same procedure (PQR) in another project, in which MDMT is -29°C.</p> <p>Question: Can we do only impact testing at -29°C and attach as an addendum of old PQR? Do we need to make a new WPS attaching old and new both record as a part of supporting WPS to ensure that at -29°C it meets acceptance criteria?</p>	<p>This issue is not addressed in API 1104, Section 5.1.</p>

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1104	21	5.3.2.2 & 5.4.2.2	1104-I-0101-19	<p>Background: The material grade for pipeline, flange and fittings were designed as X60 grade. Later the line pipe material is changed to X52 grade. Both the grades belong to material strength group b as per Clause 5.4.2.2 of API Std.1104. As per Clause 5.4.2.2 when the material of separate group is to be welded the PQR qualification shall be done with the Higher strength Groups.</p> <p>Question 1: Is it acceptable to qualify a procedure by welding X52 grade pipe and X60 grade flange for production welding of the pipe (X52) to flanges/fittings of X60 grade?</p> <p>Question 2: Are the acceptance criteria for tensile strength in the above case based on X52 which is lower strength material in the combination?</p> <p>Question 3: Is the PQR sufficient to support WPS for welding of X52 to X52 grade?</p>	<p>Response 1: Yes</p> <p>Response 2: Yes. Please see NOTE 1 in API 1104, Section 5.4.2.2 for additional guidance.</p> <p>Response 3: Yes</p> <p>NOTE: This topic is currently under review by the committee. New, proposed language may result in requirements that could change these replies based on the next edition of API 1104.</p>
1104	21	5.3.2.3	1104-I-0621-16	<p>Background: 5.3.2.3 Diameters and Wall Thicknesses - The ranges of specified outside diameters (ODs) and specified wall thicknesses over which the procedure is applicable shall be identified. Examples of suggested groupings are shown in 6.2.2 d) and 6.2.2 e). A PQR was qualified on 40" OD (diameter pipe), hence the qualification range of diameter is supposed to be specified OD greater than 12.750 in. (323.9 mm). But A WPS was received as qualified for all the diameter where the Procedure has been qualified on 40 in. API pipe.</p> <p>Question: Is the outside diameter an essential variable?</p>	<p>No. However, the range of specified outside diameters over which the procedure is applicable must be identified (in reference to section 5.3.2.3).</p> <p>NOTE Please see Section 5.1, last sentence.</p>

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1104	21	5.3.2.3	7680	<p>Background: Section 5.3.2.3 states that the wall thickness over which the procedure is applicable shall be identified. It gives examples of suggested groupings as per Section 6.2.2, Item e).</p> <p>Question 1: Is the wall thickness grouping of 6.2.2 e) a mandatory grouping for establishing the wall thickness range in a WPS as per section 5.3.2.3?</p> <p>Question 2: Based on the pipe wall thickness range of a project, can a different wall thickness range of that suggested in 6.2.2 e) be specified in a WPS, and establish that wall thickness range as an essential variable as per 5.4.2.5?</p> <p>EXAMPLE: Specified wall thickness range in the WPS: 0.469 in. to 0.875 in.; considering performing the procedure qualification on a pipe with a wall thickness of 0.625 in. to support the specified wall thickness range established in the WPS.</p>	<p>Response 1: No.</p> <p>Response 2: Yes.</p>
1104	20	5.3.2.5 and 5.4	10054	<p>Background:</p> <p>Paragraph 5.3.2.5 states that "The sizes and classification number of the filler metal and the minimum number and sequence of beads shall be designated" on a weld procedure specification. Paragraph 5.4 does not specify bead sequence as an essential variable. For the purpose of this question, back welding is considered to mean welding additional weld passes from the pipe ID side of the weld after the root and or hot pass has been deposited. In one scenario, the in-process back weld passes are completed after the root and hot pass have been deposited but before the start of the first fill pass. In an alternate scenario in-process back welding could be performed as the final passes of the weld. In-process back welding can be used to ensure a better ID bead profile as well as provide better fusion when there is ID high-low misalignment. Since this back-welding is done "in-process", it is not considered to be a repair.</p> <p>Question:</p> <p>1) Can multiple bead sequence options be specified in a welding</p>	<p>1. Yes</p> <p>2. Yes</p> <p>3. No</p> <p>4. No</p> <p>5. No</p> <p>6 (a) No</p> <p>6 (b) Yes</p> <p>6 (c) Yes</p> <p>6 (d) Yes</p> <p>6 (e) Yes</p> <p>6 (f) No</p> <p>6 (g) Yes</p> <p>7 No</p>

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				<p>procedure based on a single procedure qualification test?</p> <p>2) Can multiple bead sequence options be specified in a welding procedure based on a single procedure qualification test if the qualification test only includes one bead sequence?</p> <p>3) Is a separate qualification test record required to support each specified bead sequence?</p> <p>4) Is a separate qualification test record required to support welding from either the ID or OD side of a pipe?</p> <p>5) Since the 20th edition of API 1104 does not provide specific engineering requirements for qualification of in-process back welds does this imply that in-process back-welding should be considered prohibited by the 20th edition of API 1104?</p> <p>6a) Is a separate procedure qualification test and test record required to support the use of a back-welding option in a weld procedure?</p> <p>6b) For example: Can a welding procedure list optional back-welding passes?</p> <p>6c) For example: Can a welding procedure list optional back-welding passes if no back welding was done as part of the qualification testing?</p>	

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				<p>testing.</p> <p>[new paragraph] 6d) For example: Can a welding procedure list optional back-welding passes if sound engineering judgement is applied to determine testing for a welding procedure qualified with optional in-process back welding?</p> <p>6e) For example: If sound engineering judgement can be applied to determine testing for a welding procedure qualified with optional in-process back welding qualification testing requirement, could the testing requirements in Table 5 of the 21st Ed. of API 1104 for a back weld repair be used to test and qualify the optional in-process back weld passes?</p> <p>6f) For a procedure qualified to the 20th edition of API 1104, is the testing listed in the Table 5 of the 21st Ed. of API 1104 for back-weld repair qualification, the required method for qualifying an in-process back-weld?</p> <p>6g) Can a qualification weld be made with a portion of the test weld using back welding and a portion without back-welding so long as there is sufficient length of weld to allow for all required testing to support a welding procedure both with and without back welding?</p> <p>7) If back-welding is completed as part of the procedure qualification record, do the number of back-weld passes completed from the ID side need to be recorded as a separate variable from the number of passes on the OD?</p>	

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1104	21	5.3.2.5 and 5.4	10056	<p>Background: Paragraph 5.3.2.5 states that "The sizes and classification number of the filler metal and the minimum number and sequence of beads shall be designated" on a weld procedure specification.</p> <p>Paragraph 5.4 does not specify bead sequence as an essential variable.</p> <p>Paragraph 3.1.21 defines repair as "Any grind or welding on a completed weld to correct an individual defect or accumulation of defects in the weld that has been rejected by visual or nondestructive testing in accordance with acceptance criteria in this standard."</p> <p>Paragraph 3.1.2 defines back weld repair as a "Repair weld made at the back side of a groove weld."</p> <p>For the purpose of this question consider an "in-process back weld" the deposition of a single or multiple pass weld from the ID of the pipe in the during the process of completing the welding passes from the OD. In one scenario, the back weld passes are completed after the root and hot pass have been deposited but before the start of the first fill pass. In another scenario the back weld passes are the final passes deposited. In-process back welding can be used to ensure a better ID bead profile as well as provide better fusion when there is ID high-low misalignment. Since these geometric conditions don't occur in every weld, the application of the back weld passes is left to the discretion of the welder and is therefore often specified as optional. Since this back-welding is done "in-process", as part of the original welding process it is not considered to be a repair or a back weld repair.</p> <p>Question:</p> <ol style="list-style-type: none"> 1) Can multiple bead sequence options be specified in a welding procedure based on a single procedure qualification test? 2) Can multiple bead sequence options be specified in a welding procedure based on a single procedure qualification test if the qualification test only includes one bead sequence? 3) Is a separate qualification test record required to support each specified bead sequence? 4) Is a separate qualification test record required to support welding from either the ID or OD side of a pipe? 	<ol style="list-style-type: none"> 1. Yes 2. Yes 3. No 4. No 5. Yes 6 (a) No 6 (b) Yes 6 (c - 1) No 6 (d - 2) Yes 7. Yes

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				<p>from either the ID or OD side of a pipe:</p> <p>5) Can a welding procedure qualified to the 21st edition of API 1104 Section 5 be qualified with optional in-process back weld?</p> <p>6) Since the 21st edition of API 1104 does not provide specific engineering requirements for qualification of in-process back welds:</p> <p>a. Does this imply that in-process back-welding should be considered prohibited by the 21st edition of API 1104?</p> <p>b. If in-process back welding is not prohibited by the 21st edition, and there are no specific requirements for the qualification testing of in-process back welding in Section 5, can Company apply sound engineering judgment to develop appropriate testing for the in-process back welding?</p> <p>c. Is a separate procedure qualification test and test record required to support the use of a back-welding option in a weld procedure?.</p> <p>d. Can a welding procedure list optional back-welding passes if no back welding was done as part of the qualification testing?</p> <p>7) If sound engineering judgment can be applied to determine testing for a welding procedure qualified with optional in-process back welding qualification testing requirements, could the following be considered ;</p> <p>a. Two procedure qualification test welds are completed to support the qualification of a welding procedure with and without an optional in-process back welding?</p> <p>ai The first procedure qualification test includes the girth weld without any back-weld passes. The procedure would be tested to the requirements of Section 5 (e.g. Table 2 for qualification to the 21st edition).</p> <p>ci. The second procedure qualification test has a like-girth weld completed with the in-process back weld passes applied between the hot and first fill pass. Since there are no in-process back welding testing requirements are included in the 21st or 22nd edition, the testing requirements in Table 5 of the 21st edition for a back weld repair would be used as good engineering judgment to test and qualify the optional in-process back weld passes.</p> <p>di. In both procedure qualification tests, the essential variables for the OD weld passes would remain the same. Specific requirements for when and how the optional in-process back-welding passes are to be</p>	

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				completed would be included in the WPS at Company's discretion using good engineering judgment.	

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1104	20 & 21	5.3.2.10	1104-I-1121-15	<p>Background: Between passes, API 1104 states “the maximum time between the completion of the root bead and the start of the second bead, as well as the maximum time between the completion of the second bead and the start of the other beads, shall be designated.”</p> <p>Our understanding of the intent of API 1104, Section 5.3.2.10 is to define on the WPS, the maximum allowable time between the completion of the root bead and start of the hot pass (second pass) – which is an essential variable, as well as the maximum time between the completion of the hot pass (second pass) and start of the first filler pass (third pass). We interpret the word “beads” in this section to mean the grouping of all remaining welding passes after the second pass and therefore understands that, if the WPS specifies the maximum time between the completion of the hot pass (second pass) and start of the first filler pass, the requirement to specify the “time between the completion of the second bead and the start of the other beads” as described in API 1104, Section 5.3.2.10 is specified.</p> <p>Or alternately, should the requirement of API 1104, Section 5.3.2.10 be interpreted to mean the “maximum time between completion of second bead and third pass, second bead and fourth pass, and so on and so forth to second bead and final pass”? It is our understanding that API 1104 does not require the WPS to defined the time between each of the remaining passes as described in the sentence above.</p> <p>Question: We are requesting API to provide a concise “yes” or “no” response confirming that National’s above explanation of the intent of API 1104, Section 5.3.2.10 accurately described the purpose and objective of this section. If our understanding is inaccurate or incomplete and/or does not meet the intent of API 1104, Section 5.3.2.10, we request an explanation in order that we comprehensively understand the requirements?</p>	<p>Yes, the intent of API 1104, Section 5.3.2.10 is to identify the maximum time between the 1st pass and 2nd pass and the maximum time between the 2nd pass and 3rd pass.</p>

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1104	20	5.3.2.16 5.4.2.12	10053	<p>Background:</p> <p>1) Paragraph 5.3.2.16 states that "The range for speed of travel, in inches (millimeters) per minute, shall be specified for each pass. Paragraph 5.4.2.12 states that a change in the range for speed of travel constitutes an essential variable and requires that the procedure be requalified if this range is changed.</p> <p>2) Interpretation number 1104-I-0626-02: related to these same paragraphs referenced above in 1) for the 19th edition of API 1104, and of the same language asked "How is the range of travel speed for each pass established?" and clarified that "The Company establishes the range that they feel is appropriate."</p> <p>3) Interpretation 1104-I-0225-16: Question: "Is it acceptable to authorize multiple welding procedures under one primary PQR? Response: Yes</p> <p>Question:</p> <p>1) For the 20th edition, October 2005, (including errata/addendum (July 2007) and errata 2 (2008)) of API 1104, does the Company establish the qualified range of speed of travel using their engineering judgment?</p> <p>2) Is it required to establish a travel speed range in a procedure prior to welding a supporting test coupon for the welding procedure?</p> <p>3) Is it acceptable to establish a qualified travel speed range based on ranges recorded from a supporting test coupon?</p> <p>4) Is there a specific methodology that must be followed to define the qualified travel speed range?</p> <p>5) Is it acceptable to specify a smaller travel speed range in the welding procedure than was recorded in the qualification test record?</p> <p>6a) Is the qualified travel speed range listed on the welding procedure limited to only the exact range of values recorded in the procedure qualification record or records?</p> <p>6b) Can a Company define a range of travel speeds based on the recorded values plus a reasonable tolerance? 6bi). For example, the minimum to maximum recorded travel speed range for a pass $\pm 20\%$ for manual welds or $\pm 10\%$ for mechanized welds?</p> <p>6c) Can a Company set specify the travel speed on the WPS for a specific pass to a reasonable range that can be achieved by a normally skilled welder?</p>	<p>1. Yes 2. No 3. Yes 4. No 5. Yes 6 (a) No 6 (b) Yes 6 (c) Yes 6 (d) Yes 6 (e) Yes, for a new WPS. 7 (a) Yes 7 (ai) Yes 7 (b) No 8. No 9. Yes 9 (a) Yes 9 (b) No 9 (c) Yes</p>

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				<p>normally defined welder.</p> <p>6ci) For example, if a pass only has a single travel speed recorded for a given pass in the procedure qualification record, can a range be defined that is ± 2 IPM from the recorded value if that's determined by Company to be reasonable for the welding process?</p> <p>6d) Can Company decide how to record and document the travel speed?</p> <p>6di) For example, average travel speed per half circumference or average travel speed per full circumference or the average travel speed per electrode.</p> <p>6e) Can Company change their allowable range based on how the travel speed is calculated? 6ei) For example, ± 2 IPM for average travel speed or $\pm 20\%$ for the range defined by the individual welding electrode travel speeds?</p> <p>7a) Can multiple procedure qualification records be used to support a single weld procedure to expand the range of an essential variable, such as speed of travel?</p> <p>7ai) For example, can a second procedure qualification test be run with different travel speeds than the first procedure to support a wider range of travel speed than would otherwise be supported by only the first procedure qualification test?</p> <p>7b) Are there any limits to the number of procedure qualification tests that can be used to support a single welding procedure?</p> <p>8) Can a company update a welding procedure with a new travel speed range without requalification if the updated travel speed range remains within the range of travel speeds recorded or qualified on the original procedure qualification test for the pass in question?</p> <p>9) Can a company create a new welding procedure from an existing qualification test record or records without additional qualification testing or re-testing?</p> <p>9a) Can the new welding procedure specify a different qualified travel speed range than the original weld procedure that leveraged the existing qualification test record so long as the Company applies sound engineering judgement to define the qualified travel speed range?</p> <p>9b) Are there any limits as to the number of new welding procedures that can be written based off of existing qualification test record or</p>	

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				<p>records? 9c) Can existing qualification test records be combined to create a new welding procedure with a different travel speed range than the original weld procedure/s that leveraged the single qualification test record or a different combination of qualification test records without additional qualification testing?</p>	
1104	21	5.4	1104-I-0624-16	<p>Background: Pipe diameter limitation for WPS - with reference to Section 5.4, no pipe diameter limitation specified for WPS however as per Section 6.2.2.d) a number of 3 groups of pipe diameters are defined.</p> <p>Question 1: Is the diameter limitation applicable for welding procedure qualification?</p> <p>Question 2: Is the diameter limitation applicable for repair welding procedure qualification?</p>	<p>Response 1: No.</p> <p>Response 2: No, however, the range of specified outside diameters over which the procedure is applicable and must be identified (in reference Section 5.3.2.3). Please see API 1104, Please see section 5.1, last sentence.</p>

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1104	21	5.4.2	1104-I-1135-15	<p>Background: Concerning API 1104, Section 5.4.2, "The compatibility of the base material and the filler metal should be considered from the standpoint of mechanical properties".</p> <p>Question 1: Can we say this is a good engineering practice?</p> <p>Question 2: Is acceptable for conformance to API 1104, to adopt one filler metal E6010 classification in the root pass of a butt joints in API 5L X70-PSL 2 piping class (base metal)?</p> <p>Question 3: If the answer is positive, kindly request, who has the authority to accept this use?</p> <p>Question 4: Is it required some specific quality control procedure for the weld made with this filler metal (E6010)?</p>	<p>Response 1: Please see Special Notes in the 1104 Standard. "Users of this Standard should not rely exclusively on the information contained in this document. Sound business, scientific, engineering, and safety judgment should be used in employing the information contained herein."</p> <p>Response 2: API 1104 does not specify what filler metal to use for a particular welding procedure.</p> <p>Response 3: Not applicable, see reply 2.</p> <p>Response 4: Any combination of consumables can be used provided requirements detailed in this Standard are satisfied.</p>
1104	21	5.4.2	8576	<p>Background: Referencing Section 5.4.2, our qualified procedure calls for GTAW as the root pass and the remaining passes with SMAW. The approved/qualified WPS calls for welding processes GTAW + SMAW (for weld thickness 6.35 mm). Root pass – GTAW (3 mm) Remaining passes – SMAW (E 7010 P1) (3.35 mm)</p> <p>Question 1: If the weld process with root and first pass is performed by GTAW (as the deposited thickness of root is less than 3 mm) and the remaining passes with SMAW (E 7010 P1) without changing any other parameters, is the weld acceptable to the qualified procedure?</p> <p>Question 2: Is a new qualified procedure required (i.e., GTAW for the root and first pass)?</p>	<p>Response 1: No.</p> <p>Response 2: Yes.</p>
1104	22	5.4.2 Table 2	9437	<p>Table 2 only includes electrode E8010-P1 in Group 2. Can electrodes E8010G and E9010G be included in Group 2 of Table 2 filler metal groups?</p>	<p>No; see 5.4.2.6(f) and Table note (h).</p>

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1104	22	5.4.2 Table 2	10013	In table 2 Filler Metals Group, are the E-8010G and E-9010G electrodes included?	No. G electrodes are not included in Table 2. See 5.4.2.6.f
1104	22	5.4.2	9511	<p>Background: A gas pipeline has a branch outlet to the station. The branch was design using a weldolet and it will be welded onto the main line (run pipe). In my interpretation, the single bevel WPS can be used to weld the weldolet.</p> <p>Question: Can the qualified single bevel WPS be used to weld the weldolet since one (1) side groove at weldolet while run pipe (mainline) will not have a groove which is the joint design is similar to single bevel configuration?</p>	Yes.
1104	21	5.4.2.1	8047	<p>Background: □The WPS was qualified with TIG + ER with the first pass TIG (ER-70S6) and all the others with ER (E-8010). The base material was API 5L X70, diameter 24 in. POL, 17 mm thickness. All heat consumables are in accordance with Schedule I level inspection requirements (according to AWS) and all SMYS consumables are above the base material SMYS.</p> <p>This is a single-product pipeline and the weld inspection requirements defined by the designer (owner) required that internal penetrations should be no more than 1.6 mm. Because of this, it was decided to perform the second pass with TIG instead of ER to meet this design requirement on the production weld. Even so, the time between the first and second pass was in accordance with WPS requirements, and all the others passes were according to the WPS.</p> <p>Question: Is the application of the second pass using TIG instead of ER (as stated in the WPS) an essential variable violation? If yes, which one?</p>	<p>Yes, a change in the welding process or method of application requires requalification (see 5.4.2.1).</p> <p>NOTE This issue will be clarified in the 22nd edition of API 1104.</p>

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1104	20	5.4.2.2	10055	<p>Background:</p> <p>1) Paragraph 5.4.2.2 states "When welding materials of two separate material groups, the procedure for the higher strength group shall be used."</p> <p>2) Paragraph 5.4.2.2.c states "For Materials with a specified minimum yield strength greater than or equal to 65,000 psi, each grade shall receive a separate qualification test."</p> <p>3) API 1104 Interpretation number: 1104-I-0723-04 provides examples of qualifications required to support different grade combinations including X70 to X52 and stated that "When welding pipe of different base materials, the procedure for the higher strength base material group shall be used for the qualification of welding procedure."</p> <p>Question:</p> <p>1) Would a test record with a weld made between API 5L X70 base material to API 5L X70 base material qualify a base material range in a welding procedure for "API 5L X70 or equivalent to equal or lesser grades?"</p> <p>2) For example would a single qualification test record with a weld made between API 5L X70 base material to API 5L X70 base material qualify a procedure to weld between API 5L X70 base material to API 5L X65 base material?</p> <p>3) For example would a single qualification test record with a weld made between API 5L X70 base material to API 5L X70 base material qualify a procedure to weld between API 5L X70 base material to API 5L X52 base material?</p> <p>4) Would a test record with a weld made between API 5L X70 base material to API 5L X70 base material qualify a weld between API 5L X65 and API 5L X65 base material?</p>	<p>1. Yes</p> <p>2. Yes</p> <p>3. Yes</p> <p>4. No</p>
1104	21	5.4.2.2	1104-I-0622-16	<p>Question: Is it allowed to weld the different mechanical properties of material (P1 (API X65) to P11 (ASTM A859)) without requalifying the Procedure if the PQR is qualified with single mechanical properties of material only (API X65 to API X 65)?</p>	<p>No. ASTM A859, "Standard Specification for Age-Hardening Alloy Steel Forgings for Pressure Vessel Components" is not within the scope as defined in Section 1, which states this standard only applies to carbon and low alloy steels.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	5.4.2.2	1104-I-0626-16	<p>Background: As per clause No: 5.4.2.2, A change in base material constitutes an essential variable. We have qualified PQR with X52 (group “b”) materials.</p> <p>Question: Whether this PQR will support other materials (not X52) falls under the same group “b to b” ?</p>	No. API 1104, Section 5.3.2.2 allows materials to be grouped provided that the qualification test is made on the material with the highest SMYS in the group. The highest SMYS in the group that includes X52 (i.e., what is referred to in the inquiry as “Group B”) is X60.
1104	21	5.4.2.2	1104-I-0119-19	<p>Background: While welding materials of two separate material groups, the procedure for the higher strength shall be used.</p> <p>Question 1: If I have to weld two separate material groups (e.g. group-a to group-b), can I qualify the welding procedure using materials from both the groups (i.e. group-a to group-b)?</p> <p>Question 2: Is it mandatory to use welding procedure for higher strength material groups only?</p>	<p>Response 1: Based on the information provided, this question cannot be answered.</p> <p>Response 2: Based on the information provided, this question cannot be answered.</p>
1104	21	5.4.2.2	1104-I-1124-19	<p>Background: In API 1104 5.4.2.2 it states that “the procedure for the higher strength group shall be used”.</p> <p>Question: In order to simplify, minimize the number of weld procedures (and make compliance easier) is it possible to use a single higher strength weld procedure on all lower material groups (for example: X46 to X60 weld procedure used on X42 to Grade B)?</p>	No. The Grade B and X42 are outside of the Group B materials. NOTE This topic is being reviewed currently by the committee and may result in different requirements in a future edition.
1104	22	5.4.2.2	8697	<p>Background: The base material essential variable in Table 1, 5.4.2.2 b) presents a range of pipe wall thickness that require WPS requalification.</p> <p>Category I is for standard WPS.</p> <p>Category II is for WPS hardness and impact test:</p> <ul style="list-style-type: none"> – pipe: API 5L x60 8 in. x 12.7 mm; – impact test required. <p>Question: In Category II, what is the range of thickness required after qualification?</p>	This issue is not addressed in API 1104, 22nd Edition.

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Standard	Edition	Section	Inquiry #	Question	Response
1104	22	5.4.2.2	9928	<p>Background: We created a WPS and PQR using pipe-to-pipe (X65).</p> <p>Question 1: Is this PQR of pipe-to-pipe X65 material qualify production welding of pipe (X65) to fittings (ASTM A860 WPHY 65 or ASTM A694 Gr F65)?</p> <p>Question 2: Is it required to make a new PQR for a pipe to each type of fitting such as (pipe to hot bend, pipe to a bared tee, pipe to a tee, pipe to elbow, and pipe to flange)?</p>	<p>Response 1: Yes; please see Table 1, Footnotes b & c.</p> <p>Response 2: No, provided the “nominal” SMYS is not greater than X65 and all other essential variables remain the same. Also please see Table 1, Footnotes b & c.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	20	5.4.2.3	10058	<p>Background: Paragraph 5.4.2.3 states: "A major change in joint design (for example, from a V groove to a U groove) constitutes an essential variable. Minor changes in the angle of bevel or the land of the welding groove are not essential variables."</p> <p>For the purpose of this question consider an "in-process back weld" the deposition of a single or multiple pass weld from the ID of the pipe in the during the process of completing the welding passes from the OD. In one scenario, the back weld passes are completed after the root and hot pass have been deposited but before the start of the first fill pass. In another scenario the back weld passes are the final passes deposited. In-process back welding can be used to ensure a better ID bead profile as well as provide better fusion when there is ID high-low misalignment. Since these geometric conditions don't occur in every weld, the application of the back weld passes is left to the discretion of the welder and is therefore often specified as optional. Since this back-welding is done "in-process", as part of the original welding process it is not considered to be a repair or a back weld repair. Common examples where this may be applied would be to address misalignment between a segment-able bend or segment-able fitting to a pipe pup such as minor diameter shrinkage or ovality which are within code limits for said bend or fitting. Due to the nature of these types of misalignment the back-weld pass or passes may either be applied to the entire circumference or only a portion of the circumference as required to satisfy any specified alignment requirements. For the purpose of this question consider that all joints use the same single V bevel design.</p> <p>Question:</p> <ol style="list-style-type: none"> 1) Does the addition of a single back-weld pass around a portion of the circumference to address joint misalignment constitute a "Major change in joint design?" 2) Does the addition of multiple back-weld passes around a portion of the circumference to address joint misalignment constitute a "Major change in joint design?" 3) Does the addition of a single back-weld pass around the entire circumference to address joint misalignment constitute a "Major change in joint design?" 	<ol style="list-style-type: none"> 1. No 2. No 3. No 4. No

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				<p>change in joint design.</p> <p>4) Does the addition of a multiple back-weld passes around the entire circumference to address joint misalignment constitute a " Major change in joint design?"</p>	
1104	20 & 21	5.4.2.3	8608	<p>Background: Regarding Section 5.4.2.3 on joint design and changes to essential variables, we wish to define the interpretative difference between the single bevel fillet (branch) and lap joint fillet weld, as it relates to a change, minor or major, in essential variables.</p> <p>Question 1: If the WPS details a joint design of a single bevel fillet weld, but a lap joint fillet weld is the specific joint design to be welded, and all other essential variables remain the same, can this WPS be used in the process of fabricating the lap joint fillet?</p> <p>Question 2: Can a WPS which details a lap joint fillet weld be used in the process of fabricating single bevel fillet welds, and all other essential variables remain the same?</p> <p>Question 3: Would these changes be considered a minor or major?</p> <p>Question 4: Do minor changes require a WPS to be rewritten to show the applicable changes?</p>	<p>Response 1: No; production welds shall reflect what is specified on the WPS.</p> <p>Response 2: No; production welds shall reflect what is specified on the WPS.</p> <p>Response 3: A change from a non-bevel lap fillet weld to a bevel fillet weld is a major change (this has been clarified in the Twenty-second Edition).</p> <p>Response 4: Yes; production welds shall reflect what is specified on the WPS.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	22	5.4.2.3 Table 1	8791	<p>Background: As per subsection 5.4.2.3.a) "A change from fillet weld to a groove weld, but not vice-versa" and 5.4.2.3.b) "A major change in joint type". And "Table 1, note e" which defines the major joint types and also that "a change to or from a compound bevel within a major joint type is not considered a major change in joint type".</p> <p>Question 1: According to 5.4.2.3.a) is it correct to qualify with a butt weld to do production welds in T-fillet and / or lap-fillet?</p> <p>Question 2: According to 5.4.2.3.a) is it correct to qualify with a full penetration groove branch connection to do production welds in T-fillet and / or lap-fillet?</p> <p>Question 3: According to 5.4.2.3.b) qualifying with a butt weld single-V with a 60° angle, does it qualify for welding a butt weld single-V with a 50° angle? - (minor change within a joint type)</p> <p>Question 4: According to 5.4.2.3.b) qualifying with a butt weld single-V, does it qualify for welding a full penetration groove branch connection (single-bevel)? - (major change in joint type)</p> <p>Question 5. According to 5.4.2.3.b) qualifying with full penetration groove branch connection (single-bevel), does it qualify for welding a butt weld single-V? - (major change in joint type).</p>	<p>Response 1: Yes, this is acceptable per 5.4.2.3(a).</p> <p>Response 2: Yes, this is acceptable per 5.4.2.3(a).</p> <p>Response 3: Yes, this is acceptable per 5.4.2.3(b). See note e.</p> <p>Response 4: No, this is not acceptable per 5.4.2.3(b). See note e.</p> <p>Response 5: No, this is not acceptable per 5.4.2.3(b). See note e.</p>

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1104	21	5.4.2.4 & 5.4.2.9	1104-I-0309-17	<p>Background: API 1104, 5.4.2.4 (Position) "A change in position from roll to fixed, or vice versa, constitutes an essential variable". API 1104, 5.4.2.9 (Direction of Welding) "A change in the direction of welding from vertical downhill to vertical uphill, or vice versa, constitutes an essential variable". We have a WPS qualified to weld a pipe with a fixed horizontal axis, vertical upward progression, the other variables being equal, also a qualified welder for this purpose.</p> <p>Question: If we want to make a weld with the same WPS and same welder but in a fixed vertical axis pipe welding in a horizontal position, do we need to qualify a new WPS and welder mentioned for this new situation?</p>	No for the WPS; yes for the welder.
1104	21	5.4.2.5	1104-I-0305-17	<p>Background: Our company is currently planning to perform butt welding on two (2) NPS 30 API 5L X70 line pipe with different thickness. One of the line pipe thicknesses is 7.56 mm, and the other is 22.1 mm. WPS have been qualified using base metal of NPS 30 API 5L X70, with wall thickness of 10.88 mm. The 22.1 mm pipe will be chamfered to 7.56 mm before the welding. Paragraph 6.2.2 (e) stated that wall thickness of 22.1 mm and 7.56 mm are on the different groups.</p> <p>Question: Can we use the qualified WPS for NPS 30 API 5L X70 with wall thickness of 10.88 mm pipe to perform butt weld on NPS 30 API 5L X70 (with wall thickness of 22.1 mm) with NPS 30 API 5L X70 (with wall thickness of 7.56 mm)?</p>	Yes.
1104	21	5.4.2.5	1104-I-0308-18	<p>Background: With respect to WPSs we have the qualified thicknesses grouped in accordance with section 6.2.2 e as suggested in 5.4.2.5.</p> <p>For simplicity I'll call the first group A, the second B, and the third C. We have PQRs to support fillet welds on materials thickness B to thickness B as well as fillet welds on thickness C to thickness C.</p> <p>Question: Are these PQRs sufficient to weld thickness B to thickness C fillet welds?</p>	Yes. A new WPS with the newly defined thickness range supported by either of the two existing PQRs could be written.

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1104	21	5.4.2.6	1104-I-0301-17	<p>Background: A welding procedure qualified as per API 1104 with SMAW process, bevel fillet weld (branch connection), root pass with cellulosic electrodes (Table 1 Group 1) and low hydrogen electrodes (Table 1 Group 3, eg E7018-1) used for the remaining passes.</p> <p>Question: Can the above qualified welding procedure be used to support a new WPS for production welds under SMAW process for non-bevel lap fillet weld, using exclusively low hydrogen electrodes (Table 1 Group 3 e.g., E7018-1) for root and remaining passes without changes of other essential variables?</p>	Yes.
1104	21	5.4.2.8	1104-I-0314-17	<p>Background: In API 1104, Time between the passes is an essential variable.</p> <p>Question 1: If the time exceeds the maximum limit, is the weld to be cut-out?</p> <p>Question 2: If the time exceeds the maximum limit, can one heat the pipe to certain (preheat) temperature and continue the second pass?</p>	<p>Response 1: This weld would be in violation of 5.4.2.8. The disposition of such welds is not addressed by this Standard.</p> <p>Response 2: No</p>

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1104	22	5.4.2.9	8995	<p>Background: Changes in preheat requirements in API 1104 latest edition mandates preheating only when WPS specifies it, or only when base metal is below 16 deg.</p> <p>For cellulosic electrodes, since moisture is between 3-7%, as mandated by electrode the manufacturer, preheat is recommended regardless of ambient temperature/base metal grade to avoid possible hydrogen induced cracking.</p> <p>As you are aware about the fact that pipe preheating is required in case of higher carbon content, and in some cases with lower base metal temperature as mandated by ASME B31.8, along with this with possible hydrogen induced cracking in metal with Cellulosic Electrode (as they have moisture for deeper penetration and better operation) Similar preheating recommendations are mandated by TWI, UK and EN 1101-2.</p> <p>These electrodes can't be baked as well therefore to avoid Hydrogen diffusion Pre- Heating is a required phenomenon however with this latest edition our vendors/subcontractors are getting confused and requesting for waiver which can set up a precedence in entire welding industry.</p> <p>Question: Does 5.4.2.9 require preheating only when base metal temperature goes below 16 deg when it is not mentioned in WPS?</p>	<p>No. The WPS shall list the minimum preheat temperature per 5.3.2.13. When preheat is not applied during qualification, the minimum preheat temperature shall be per 5.4.2.9(b).</p>
1104	21	5.4.2.13	1104-I-0224-16	<p>Background: API 1104, Section 5.4.2.13 says, "A decrease in the specified minimum preheat temperature constitutes an essential variable".</p> <p>Question: It is the beginning of the first pass which corresponds to the minimum preheating temperature specified?</p>	<p>Yes, it is also the temperature prior to the start of each pass.</p> <p>NOTE: Please refer to AWS A3.0 for the definition of "preheat".</p>
1104	22	5.6.1 Table 3	9582	<p>A PQR was qualified in accordance with Table 3 without doing Nick break test by doing RT. Does the welder qualification (same welder used in PQR) required Nick break test as per Table 7?</p>	<p>No; see 6.6.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	5.6.2.2	1104-I-1030-18	<p>Background: Section 5.6.2.2, indicate "the tensile strength shall be computed by dividing the maximum load at failure by the smallest cross-sectional area".</p> <p>Question: Is the definition "maximum load at failure" the maximum load?</p>	<p>The noted section is ambiguous as the maximum load is not experienced at the point of failure.</p> <p>The normative reference ASTM A370, and in turn ASTM E8 can be used to correctly calculate tensile strength. ASTM E8 indicates "maximum force" will be used in this calculation.</p> <p>Section 5.6.2.2 will be sent to the responsible subcommittee to correct this, or to address in a future edition.</p>
1104	21	5.6.3.3	1104-I-1120-19	<p>Background: Section 5.6.3.3 specifically specifies acceptance criteria for inadequate penetration, incomplete fusion, porosity, slag inclusions and fisheyes. The reference to Figure 6 implies that it only relates to slag inclusions.</p> <p>Question 1: Is it the committee's interpretation that the reference to Figure 6 in API 1104 (21st Edition and/or 20th Edition), Section 5.6.3.3 only applies to slag inclusions?</p> <p>Question 2: Is it the committee's interpretation that the reference to Figure 6 does not include IFD, as defined in section 9.3.5 and therefore no IFD is allowed per section 6.5.3?</p>	<p>Response 1: No. The reference to Figure 6 in API 1104, 5.6.3.3 is not meant to be exclusive to slag inclusions.</p> <p>Response 2: No. Figure 6 in API 1104, 5.6.3.3 does apply to IFD in how to dimension a flaw, and the acceptance criterion for lack of fusion is zero; any IFD is a basis for rejection.</p>
1104	21	5.7 Figure 10	1104-I-1132-15	<p>Question: Is it correct to assume that when qualifying a repair procedure, for repair of fillet welds, that the procedure can be qualified by destructively testing a total of (4) side bends?</p>	<p>No, side bends are not part of the fillet weld qualification testing matrix, see API 1104, Figure 10.</p> <p>NOTE: Qualification of a Fillet Weld Repair Procedure is currently not addressed by API 1104, Section 10. The subcommittee will consider including this in a future revision of API 1104.</p>

API Std 1104 Interpretations - Welding of Pipelines and Related Facilities

Last update: May 2024

Standard	Edition	Section	Inquiry #	Question	Response
1104	21	6	1104-I-1126-16	<p>Question 1: Per the API 1104 code, a welder passed a butt and branch test on 12" or larger pipe with cellulose root and hot pass; and fill and cap with low hydrogen. Since he ran a butt and branch with low hydrogen as the filler metal, is he qualified to weld a fillet weld completely?</p> <p>Question 2: A current person is trying to say they must run the root and hot pass in the fillet weld with cellulose because the welder took a butt and branch root and hot pass was with cellulose?</p> <p>Question 3: In my interpretation a fillet weld has backing so it is a fillet weld and the welder ran the filler passes on the butt & branch with low hydrogen so he can weld any fillet weld with low hydrogen?</p> <p>Question 4: If it was a butt weld then he would have to run cellulose for root & hot pass then fill and cap with low hydrogen?</p> <p>Question 5: For a welder to be qualified to run an open root on a "BRANCH" connection with low hydrogen would a 2" schedule 160XXH butt weld test welded completely with low hydrogen per the ASME code qualify the welder to run a branch connection?</p> <p>Question 6: Am I correct to say to be qualified to weld any "Branch" connection completely with low hydrogen the welder would have to qualify by passing a 12" branch with low hydrogen electrodes for the complete weld?</p>	<p>Response 1: Yes</p> <p>Response 2: No, the interpretation of the "current person" is incorrect.</p> <p>Response 3: Yes</p> <p>Response 4: Yes</p> <p>Response 5: API does not address ASME Code requirements.</p> <p>Response 6: No, a multiple qualification (butt and branch) using only Group 3 electrode is required. Additionally, essential variables for welder qualification would still apply.</p> <p>NOTE: API presumed that the original butt and branch WPS was qualified with cellulosic electrodes used for the 1st and 2nd passes, and low hydrogen electrodes used for remaining passes.</p>
1104	21	6	8232	<p>Question: Can we perform welder qualification using one pipe (12 in.) for two welders?</p>	<p>Yes, provided the testing requirements (number and location) for each welder are satisfied.</p> <p>NOTE The qualification range is specified in 6.2.2 or 6.3.2.</p>
1104	21	6.1	1104-I-1118-17	<p>Question: Per API 1104, Section 6.1, does a welder have to perform the entire weld by himself or can the welder perform a weld on half of a pipe for 12" and over (from 0 to 6 o'clock and then test).</p>	<p>Yes, one welder can perform ½ of a circumferential weld as long as the test requirements are satisfied in accordance with API 1104, 21st Edition, Section 6.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	6.2	1104-I-1118-15	<p>Background: In API 1104, Section 6.2 single qualification for butt welding pipe OD less than 2.375" and wall thickness less than 0.188" are essential variables which would require a welding procedure of its own to qualify a welder to do so. On the other hand, in API 1104, Section 6.3 multiple qualification states taking two test, first is butt weld of OD at least 6.625" and wall thickness at least 0.250" which would qualify the procedure for (ALL) butt welds from 12.750" OD and less also (ALL) wall thickness up to 0.750" and the second is branch of the same size OD 6.625" and wall thickness at least 0.250" which would qualify the procedure from 12.750" OD and wall thickness 0.750" and less.</p> <p>Question 1: Is there any terminology in the API 1104 standards that tells us that a separate test is required to qualify a procedure to weld on pipes less than 2.375" OD and wall thickness less than 0.188" for a multiple qualification?</p> <p>Reasoning, they are the same test, butt and branch why would the 1.1/2" butt weld NOT be required in the multiple qualification?</p> <p>Question 2: If so where is it, (what section)?</p> <p>Question 3: Are we covered to weld a butt weld on a 3/4" steel service line?</p> <p>Question 4: Are we covered to weld a 3/4" socket fitting on a service line?</p>	<p>Response 1: No, see API 1104, Section 6.3.2.</p> <p>Response 2: Not applicable, see Response 1.</p> <p>Response 3 & 4: Questions 3 & 4 cannot be answered given that insufficient information was provided.</p>
1104	21	6.2	1104-I-0102-19	<p>Background: A contractor wants to qualify their welders in 36" diameter pipe with 2 welder in single coupon for pipeline 5G position.</p> <p>Question: Can two welders qualify in single coupon of 36" diameter per API 1104 clause 6.2?</p>	<p>There is insufficient information regarding reference to "coupon" or the roles of the welders that can result in a response to this question. However, previously issued interpretations 1104-I-1115-04 and 1104-I-0302-00 may provide information of value to you.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	22	6.2	9511	<p>Background: A gas pipeline has a branch outlet to the station. The branch was design using a weldolet and it will be welded onto the main line (run pipe). In 6.2.2 (h) "A change in the joint design [see Note d) of Table 1]...". When referring to Table 1, the joint design is on note e).</p> <p>Question: Should 6.2.2 (h) refer to note e) instead of note d)?</p>	Yes; (this has been identified for an erratum.)
1104	21	6.2.1	1104-I-1128-15	<p>Background: For single qualification of a welder contractors are questioning the fact that we are requiring the welder to complete a "Butt Weld" on 20 inch O.D. pipe for production welding on 20" .300 W.T. piping. The contractor has opted not to take the 12.750 "Butt and Branch" for multiple qualification which would allow the welders to then weld all diameters. The contractors are opting to single qualify so I instructed them that if they are wanting to single qualify that each welder will have to complete a 20" "Butt weld" and have it destructively tested per API 1104 which states that for 20" .300 W.T. 12 specimens shall be taken and shall be taken from locations "Equally spaced around the pipe". The contractor is stating that the welder should be able to "Brother-In-Law" the 20" pipe on the test. Which in my opinion is incorrect due to the fact of the welder not making a complete weld around the entire circumference of the pipe and that would prohibit the removal of the correct amount of test specimens " Spaced equally around the pipe" on each welder. We would only be able to remove the specimens on each welder on half of the pipe so in my opinion the welder would not be qualified per API 1104 to weld on 20" O.D pipe.</p> <p>Question: I have told the contractors that I have not seen anything in API 1104, Section 6 (Qualification of Welders) that says the welders allowed to "brother-in-law" a qualification test. Is this interpretation of Section 6 of API 1104 correct?</p>	No, see API 1104, Section 6.2.1 "...segments of pipe nipples."; testing as defined in API 1104, Figure 12, including Note 1 apply.

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	6.2.1	1104-I-0623-16	<p>Background: Procedure A was written and qualified with X-52 pipe. The welder, when tested and qualified to procedure A, tested on X-65 pipe. Per 1104, base material is not an essential variable when qualifying a welder, only when qualifying a procedure.</p> <p>Question: If the pipeline consists of only X-52 pipe, is the welder qualified to weld on this pipe per API 1104?</p>	No. API 1104, Section 6.2.1 says "...a welder shall make a test weld using a qualified procedure...". A procedure qualified on X52 is not qualified for welding X65.
1104	21	6.2.1	8513	<p>Background: A qualified procedure for a material grade of X65 pipe was used for a welder qualification test. The process used was GMAW-C. The pipe sizes used were a 12.75"X0.75" and a 14"X0.50". In 6.2.1 it states, "for qualification to a single weld procedure specification, a welder shall make a test weld using a qualified procedure to join pipe nipples or segments of pipe nipples." I'm interested in the weight of the first part of the statement regarding for qualification to a single weld procedure. The range of material grades used in production would be X42 through X70.</p> <p>Question 1: Does the requirements of section 6.2.1 limit the welder to a specific grade of material?</p> <p>Question 2: Is it the intent of the code to limit the welder qualification range to what was listed in the WPS as essential variables?</p> <p>Question 3: Would a welder qualified on a X65 pipe test be qualified for any other grade of material, keeping in mind a qualified WPS/PQR already exists for each range of material grades?</p>	<p>Response 1: No.</p> <p>Response 2: No.</p> <p>Response 3: Yes.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	20	6.2.1	9807	<p>Background: Section 6.2.1 states "a welder shall make a test weld using a qualified procedure to join pipe nipples or segments of pipe nipples." Section 6.3.1 states "a welder shall successfully complete the two test described below, using qualified procedures"</p> <p>It is my interpretation that 6.1 allows the utilization of segments of pipe nipples for both 6.2 and 6.3. However, another interpretation is that since section 6.1 states "as specified in 6.2.1" segments of pipe nipples are only allowed under 6.2 and not 6.3.</p> <p>Question 1: Is it acceptable for two welders, "brother-in-law", to be qualified on a single butt weld pipe nipple for section 6.2 and the first test in 6.3? Provided both welders weld each half , all other requirements of section 6 are followed and as required the total number of test specimens from table 3 are taken for each welder.</p> <p>Question 2: Can the butt weld of a 6.3 multiple-qualification be completed by multiple welders using segments as described in 6.2, commonly referred to as brother-in-law?</p>	<p>Response 1: Yes; see 6.5.1.</p> <p>Response 2: Yes; see 6.5.1.</p>
1104	21	6.2.1 6.2.2	1104-I-0109-19	<p>Question: Can a welder who has successfully qualified per API 1104, Section 6.2.1 on a V bevel butt weld in the fixed position with the axis of the pipe nipples in the horizontal plane and using a qualified welding procedure weld on a pipe to fitting (such as 45, 90 degree fittings or weld neck flange) V bevel butt weld with the pipe in the fixed position and the axis in the horizontal plane as long as the welding is welding within the pipe diameter and wall thickness group qualified in and as long as none of the other essential variables in Section 6.2.2 have been changed?</p>	<p>Yes.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	6.2.1 6.2.2	1104-I-1130-15	<p>Background: API 1104, Section 6.2.1 states: "For qualification to a single weld procedure specification, a welder shall make a test weld using a qualified procedure..."</p> <p>Question 1: Is a welder qualified to weld using any welding procedure specification that has the same essential variables listed in API 1104, Section 6.2.2 as the welding procedure used for welder qualification?</p> <p>Questions 2: Is it the intent of API 1104, Section 6.2 to limit the welder to be qualified for a single welding procedure specification that was used for welder qualification?</p>	<p>Response 1: Yes</p> <p>Response 2: No</p>
1104	21	6.2.2	1104-I-0406-15	<p>Background: In item 6.2.2 for single qualification welders, specifies the following condition for the essential variable of the filler metal "A change of filler metal classification from Group 1 or 2 to any other group or from any Group 3 through 9 to Group 1 or 2 (see Table 1)".</p> <p>Question 1: As interpretation of this section can we say that if I have a welder with a classified in group 1 electrode, is qualified to complete welding with electrodes which are in Group 2 and vice versa?</p> <p>Question 2: If the welder does the qualification under a procedure having electrodes of Group 1 and Group 2. This welder can complete welds in Group 1 and Group 2?</p>	<p>Response 1: Yes.</p> <p>Response 2: Yes.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	6.2.2	1104-I-0315-17	<p>Background: Section-6.2 (single qualification) a welder who has successfully completed the qualification test described in 6.2.1 shall be qualified within the limits of the essential variables described below. If any of the following essential variables are changed, the welder shall be requalified using an applicable qualified procedure.</p> <p>d) A change from one specified OD group to another.</p> <p>e) A change from one specified wall thickness group to another.</p> <p>A welder was qualified on a 46" dia pipe (greater than 12.750" dia) of wall thickness 0.833" (21.15 mm) i.e. greater than 0.750 inch. The welder has deposited a weld metal thickness of 4.8mm, 19.1mm and more than 19.1 mm i.e. 21.15 mm.</p> <p>Question 1: Can the welder weld any thickness (Since he has covered the highest possible thickness covered in the standard) above 12.750 inch dia pipe or not?</p> <p>Question 2: Or he can weld only 19.1mm wall thickness and above?</p>	<p>Response 1: No</p> <p>Response 2: No, only above 19.1 mm thickness.</p>
1104	21	6.2.2	1104-I-1118-19	<p>Background: We have a WPS qualified in accordance with API Standard 1104 in direction of welding from vertical uphill on the roots pass and vertical downhill on all remaining weld passes. The welder has two separated WPQs: 1) Direction of weld vertical Uphill 2) Direction of weld vertical Downhill. The rest of variables are according to WPS.</p> <p>Question: Can the welder weld combine both WPQs?</p>	<p>Yes. This is allowed provided both of the welder qualifications are in conformance with API 1104, Section 6</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	6.2.2.e	1104-I-0113-19	<p>Background: Assume the following condition exists: The thickness groups are defined in the WPS as listed in 6.2.2(e). A base metal has an actual measured wall thickness less than the lower specified wall thickness limit in the listed thickness group, but the actual measured wall thickness is within the allowable wall thickness tolerance applicable to the base metal specification or standard. (example: the specified pipe thickness is 0.188 inch nominal. The applicable thickness group is 0.188 through 0.750 in. The actual measured wall thickness is 0.173 in. Assume the manufacturing specification allows a minimum actual wall thickness of 0.170 in.).</p> <p>Question: For the purpose of welder qualification and WPS applicability when the WPS cites thickness groups of 6.2.2(e) may the base metal thickness (in this example 0.173 in. actual) be considered to be within the thickness range applicable to the specified thickness (in this case 0.188 through 0.750 in.)?</p>	Yes.
1104	21	6.2.2 e)	1104-I-0114-19	<p>Background: Assume the following condition exists: The thickness groups are defined in the WPS as listed in 6.2.2(e). A pipe component has a specified wall thickness of less than 0.750 inch. Wall thickness variation from the manufacturing process results in some locations having actual thickness that exceed 0.750 in.</p> <p>Question: Per 6.2.2(e) may the component with a specified wall thickness of 0.750 in. and an actual wall thickness greater than 0.750 in. be, for purpose of WPS applicability and welder qualification, in the 0.188 to 0.750 in. grouping?</p>	Yes.
1104	21	6.2.2 e)	1104-I-0115-19	<p>Background: Assume the following condition exists: The thickness groups are defined in the WPS as listed in 6.2.2(e). A pipe with a specified wall thickness of 0.179 in. has an actual wall thickness of 0.188 in.</p> <p>Question: For purpose of WPS applicability and welder qualification does the pipe fall within the specified wall thickness group of 0.188 through 0.750 in.?</p>	No.

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	6.2.2 e)	1104-I-0116-19	<p>Background: Assume the following condition exists: The thickness groups are defined in the WPS as listed in 6.2.2(e). A pipe has a specified wall thickness within the thickness group of 0.188 through 0.750 in. but localized corrosion or erosion has reduced the actual wall thickness in SOME locations to less than 0.188 in. and to less than the lower limit of the manufacturing wall thickness tolerance for the specified wall thickness.</p> <p>Question: Should the thickness be considered to be within the 0.188 through 0.75 in. thickness range for the purpose of WPS applicability and welder qualification?</p>	Section 6 of API 1104 is silent on use of legacy (vintage) materials which are out of conformance to the original manufacturing specification.
1104	21	6.2.2 e)	1104-I-0117-19	<p>Background: Assume the following condition exists: The thickness groups are defined in the WPS as listed in 6.2.2(e). A pipe has a specified wall thickness within the thickness group of 0.188 through 0.750 in. but corrosion or erosion has reduced the actual wall thickness in ALL locations at and near the weld to less than 0.188 in. and to less than the lower limit of the manufacturing wall thickness tolerance for the specified wall thickness.</p> <p>Question 1: Should the thickness be considered to be within the 0.188 through 0.750 in. thickness range for the purpose of WPS applicability and welder qualification because the specified (nominal) wall thickness is in this range?</p> <p>or</p> <p>Question 2: Should the thickness be considered to be within the less than 0.188 in. range for the purpose of WPS applicability and welder qualification because the actual wall thickness is in this range?</p>	Section 6 of API 1104 is silent on use of legacy (vintage) materials which are out of conformance to the original manufacturing specification.

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	6.2.2 e)	1104-I-0118-19	<p>Background: Assume the following condition exists: The thickness groups are defined in the WPS as listed in 6.2.2(e). The pipe has a specified wall thickness of greater than 0.750 in. Taper boring and related weld bevel preparation reduced the thickness of the weld joint to less than 0.750 in.</p> <p>Question 1: Should the pipe be considered to have a thickness of greater than 0.750 in. for the purpose of WPS applicability and welder qualification because the specified (nominal) wall thickness away from the joint is in this range?</p> <p>or</p> <p>Question 2: Should the pipe be considered to have a thickness within the 0.188 through 0.750 in. thickness range for the purpose of WPS applicability and welder qualification because the actual wall thickness at the joint is in this range?</p>	<p>Response 1: No</p> <p>Response 2: Yes</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	6.2.2 e)	1104-I-1125-19	<p>Background: A welder is qualified with combination of process on 16mm thickness pipe, like GTAW + SMAW. GTAW is used in root pass, hot pass for the total weld deposit of 4 mm; the remaining 12 mm thickness of the pipe is welded by SMAW process.</p> <p>Question 1: Is the welder allowed to carry out welding of individual process such as GTAW only for pipe group 6.2.2.e(1) that has a pipe wall thickness limit up to 4.8 mm?</p> <p>Question 2: Is the welder allowed to carry out welding of an individual process, such as SMAW only, for pipe group 6.2.2.e(2) that has wall thickness limit from 4.8 mm to 19.1 mm?</p> <p>Question 3a: During construction of large diameter pipelines, are welders assigned in groups, i.e., root / hot to be deposited by one group of welders and filling/cap passes to be deposited by the other group of welders after them?</p> <p>Question 3b: Is it mandatory to perform welding only with the combination of processes associated to wall thickness group?</p>	<p>Response 1: No. For a single welder, a change in combination of weld processes is an essential variable.</p> <p>NOTE Deposited weld metal and wall thickness does not apply to this topic.</p> <p>Response 2: No. For a single welder, see response No. 1.</p> <p>Response 3a: API 1104 is silent on this topic. However, welders may be assigned to make specific passes of production welds rather than to weld the entire joint. The welder's qualification testing must have included the welding of those passes using the same filler metal group that they use in production.</p> <p>Response 3b: Yes. A combination of processes and wall thickness are essential variables on welding.</p>
1104	21	6.2.3 10.4.1	1104-I-0223-16	<p>Background: API 1104, Section 6.3.2 lists the essential variables for the welder who has qualified in compliance with part 6.3, Multiple Qualification. API 1104, Section 6.3.2 lists specifically three essential variables for a welder who has qualified by the multiple qualification process. Basically, if the welder qualifies performing the 12-3/4" OD butt weld and the full size 12-3/4" branch on run weld successfully, they are qualified unlimited within the limits of the listed essential variables.</p> <p>Question: Does the statement in API 1104, Section 10.4.1 add an essential variable to API 1104, Section 6.3.2?</p>	<p>Yes, just as the essential variables in API 1104, Section 12 and API 1104, Annex A are not referred to in API 1104, Section 5, these requirements in API 1104 Section 10 do not need to be referred to in API 1104, Section 6. However, the reverse is not true.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	6.2.3 10.4.1	1104-I-0223-16	<p>Background: API 1104, Section 6.3.2 lists the essential variables for the welder who has qualified in compliance with part 6.3, Multiple Qualification. API 1104, Section 6.3.2 lists specifically three essential variables for a welder who has qualified by the multiple qualification process. Basically, if the welder qualifies performing the 12-3/4" OD butt weld and the full size 12-3/4" branch on run weld successfully, they are qualified unlimited within the limits of the listed essential variables.</p> <p>Question: Does the statement in API 1104, Section 10.4.1 add an essential variable to API 1104, Section 6.3.2?</p>	<p>Yes, just as the essential variables in API 1104, Section 12 and API 1104, Annex A are not referred to in API 1104, Section 5, these requirements in API 1104 Section 10 do not need to be referred to in API 1104, Section 6. However, the reverse is not true.</p>
1104	21	6.2.3c	1104-I-0408-15	<p>Background: The 21st Edition changed the language requiring welder requalification when a change of filler metal from Group 1 or 2 to any group. etc. versus the 20th Edition which was specific to changes to/from Group 3 filler metals.</p> <p>Question: Am I correct that the 21st Edition language means that a change from Group 1 to Group 2 (i.e. any other group) filler metal constitutes welder requalification?</p>	<p>No. A change from Group 1 to Group 2, or vice versa, does not constitute an essential variable.</p>
1104	21	6.2 & 6.3	1104-I-1121-17	<p>Background: We are making mainline welds with all downhill procedures. The repair procedure is with low-high filler metal.</p> <p>Question 1: Does the welder have to be qualified single or multiple qualifications with our low-high procedure?</p> <p>Question 2: Is it ok for him or her to be qualified with the downhill cellulose procure prior to testing to fix repairs?</p>	<p>Response 1: No, the welder does not need to use the low-hydrogen (Group 3) welding procedure. The welder may use any welding procedure to qualify per API 1104 (21st Edition), Sections 6.2 or 6.3, prior to repair welder qualification testing per API 1104 (21st Edition), Section 10.4.</p> <p>Response 2: Yes.</p>
1104	21	6.3	1104-I-0110-19	<p>Question: Is a welder who attempts the multiple qualification in API 1104, Section 6.3 and successfully completes the butt weld test but is not successful in qualifying on the branch test still qualified to weld within the limits of the essential variables of the butt weld qualification?</p>	<p>Yes, as long as the requirements of API 1104, Section 6.2 are satisfied.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	6.3	1104-I-0112-19	<p>Background: A single welder performs a multiple qualification test in accordance with section 6.3 using an E6010 electrode for the root bead and E7010 electrode for all subsequent beads with all beads' progression in downhill direction. The same welder then performs a second multiple qualification test in accordance with section 6.3 using an E7018 electrode for the entire weld with progression in the uphill direction. Each of these tests are performed in accordance with a qualified welding procedure specification.</p> <p>Question: Is the welder qualified to make a production weld using an E6010 electrode for the root bead in the downhill progression and an E7018 electrode for the filler beads in the uphill progression provided that there is a qualified welding procedure specification for the welder to work to?</p>	Yes.
1104	21	6.5.1 Table 3	1104-I-0306-17	<p>Background: In accordance with API 1104 - 2013 ADDENDUM 2014, table 3 type and number of butt weld specimens per welder of Welder Qualification test and Figure 12 shows the location of specimens.</p> <p>Question: Can we use a single coupon for two welders (12-3-6 'O' clock and 12-9-6 'O' clock)? Or a single welder to complete 360° complete circumference? In that case, if two welders, then can you specify the required quantity of specimens?</p>	Yes, provided the testing requirements (number and location) for each welder are satisfied.
1104	22	6.5.1	9923	<p>Background: Clause 6.5.1 states the specimens shall be air cooled to ambient temperature prior to testing. Clause 5.6.3.2 states the nick break specimens shall be broken through the weld by any convenient method. This doesn't exclude other testing methods. Nick break testing using liquid nitrogen bath, gives us better visual interpretation of fractured surfaces for discontinuities and soundness through the weld. Clause 6.5.1 gives us challenges in interpretation of discontinuities after cold bending.</p> <p>Question: Can the nick break specimens be tested at temperature lower than ambient temperature?</p>	The 22nd edition of API 1104 does not address this issue. See the last paragraph in Section 1.

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	6.6	1104-I-1133-15	<p>Background: I understand automatic ultrasonic testing is the technique able to record in 100% the weld inspected.</p> <p>Question 1: Is this correct?</p> <p>Question 2: Can I use semi-automatic scanner for this application or only automatic scanner shall be apply?</p>	<p>Response 1: The question is unclear. API can only address questions that pertain directly to the requirements with the document.</p> <p>Response 2: No, API 1104, Section 6.6.1 refers to automatic ultrasonic testing.</p>
1104	21	7	1104-I-1117-15	<p>Background: We want to use lineup clamp for root bead weld.</p> <p>Question: Can we use a bridge tack in the butt joint after removal of the clamp; is it possible?</p>	<p>Bridge tacks are not addressed in API 1104. See API 1104, Section 7.3.</p>
1104	21	7.8.2	1104-I-0409-15	<p>Background: For position welding, the number of filler and finish beads shall allow the completed weld a substantially uniform cross section around the entire circumference of the pipe. At no point shall the crown surface fall below the outside surface of the pipe, nor should it be raised above the parent metal by more than 1/16 in. (1.6 mm).</p> <p>Question: If the same thing applies to the pass root?, I mean if the thickness material at the root pass should not exceed above the parent metal by more than 1/16 in. (1.6 mm)., according to paragraph 7.8.2 according to API 1104, or not?</p>	<p>No. Section 7.8.2 is applicable to filler and finish beads on the outside surface of the pipe only.</p>
1104	20	7.9.2	9079	<p>Background: This request for interpretation relates to projection of the root bead in a full penetration butt weld. Referencing the 20th Ed. Figures 13 through 18 depict various weld defects, some of these figures accurately depicting a modest projection of the root bead inside the pipe. I am aware of the language in 7.9.2 of the 20th Ed. Recommending the cover pass to be no higher than 1/16" proud of the base metal. The word "should" is utilized here, implying a recommended practice more so than a requirement.</p> <p>Question: Does API 1104 20th edition or later contain any prescriptive language (or even a recommended practice) limiting the projection of the root bead to the interior of a full penetration butt weld joint?</p>	<p>No.</p> <p>NOTE: 7.8.2 in the 22nd Ed. was revised for the cap pass height and width.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	8.3	1104-I-0307-17	<p>Background: We are discussing about “the welding inspection personnel qualification process of a pipeline construction project, welded according to the API 1104:2013 requirements”. In order words: welding inspector responsible to perform the visual welding inspection.</p> <p>Question: In this situation is correctly to say that, in order to define the enough qualification requirement of one welding inspector, that will work in a project build according to the API requirement, we need to follow the requirement of item 8.3 of API 1104: 2013?</p>	Yes.
1104	21 & 22	8.4.1	8861/8862	<p>Background: The American Welding Society (AWS) has a well-established and nationally recognized certification program, the Certified Radiographic Interpreter (CRI). Under the AWS CRI program, individuals possessing adequate training and experience are eligible to sit for three examinations (i.e. General, Specific, and Practical) covering aspects of radiographic film interpretation in accordance with AWS standard B5.15 Specification for the Qualification of Radiographic Interpreters. Upon receiving passing scores, individuals are qualified and certified as AWS CRIs capable of interpreting, evaluating, and reporting the results found on film radiographs while working to various standards, including API 1104.</p> <p>Question 1: Is paragraph 8.4.1 inclusive of Level II Limited Certifications?</p> <p>Question 2: Is the American Welding Society Certified Radiographic Interpreter (AWS CRI) Certification considered a recognized national certification program in accordance with paragraph 8.4.1?</p> <p>Question 3: If the answer to Question (1 and 2) is yes, if the company deems the AWS CRI as acceptable for film interpretation, in accordance with paragraph 8.4.1, may the company use an individual holding an AWS CRI for radiographic film interpretation, evaluation, and reporting without any additional qualification or certification?</p>	<p>Response 1: No.</p> <p>Response 2: API 1104 is silent on this topic. This is left to the company.</p> <p>Response 3: Not applicable, see response to 1. and 2.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	9.3	1104-I-1119-17	<p>Background: Many CWI Inspectors tell me that the 1104 standard on Porosity is 1/8 in. and larger is considered a defect. And the 25% rule applies only when two different wall thickness are joined its 25% of the thinnest one.</p> <p>Question 1: Is 1/8 in. and larger considered a defect?</p> <p>Question 2: Does the 25% rule apply only when two different wall thickness are joined?</p>	<p>Response 1: No, In accordance with API 1104, 21st Edition, Section 9.3.9.2a. an individual pore must exceed 1/8" to be considered a defect.</p> <p>Response 2: No, In accordance with API 1104, 21st Edition, Section 9.3.9.2b the thinner of the two wall thicknesses applies even when both wall thicknesses are the same.</p> <p>NOTE: If the wall thicknesses are the same size, then both are considered equally thin.</p>
1104	21	9.3.8 9.3.9	1104-I-1123-19	<p>Question 1: Is it the intent of API 1104 21st ed to leave the definition of elongation undefined by the standard within the radiographic acceptance criteria listed in 9.3.8 and 9.3.9?</p> <p>Question 2: If not, is It the intent to use a definition listed in another section of the standard?</p>	<p>Your questions cannot be addressed as asked. API does not address intent of requirements that are clearly stated. You may resubmit your questions against specific requirements that can be reviewed.</p>
1104	21	9.3.8.2 e)	1104-I-0312-17	<p>Background: API 1104, section 9.3.8.2(E) states that if the maximum width of an ISI indication exceeds 1/8" then it is not acceptable. Should it say "an individual ISI indication shall not exceed 1/8", instead of "width of an ISI indication"? If you have an individual indication then it would not be considered aggregate therefore you should not be allowed 1/2" for an individual indication that is not greater than a 1/8" in width. For an indication that is 1/8" in width once it is greater than 3/8" in length it would be considered elongated therefore it would then be unacceptable for being greater than 1/16" in width.</p> <p>Question 1: Should an ISI indication be measured as a rounded indication, whereas 1/8" would be the maximum dimension of an individual ISI indication?</p> <p>Question 2: Should the criteria in section 9.3.8.2 (E) state that "The size of an individual ISI indication exceeds 1/8" (3 mm)"?</p>	<p>Response 1: No</p> <p>Response 2: No</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	20 & 21	9.3.8.2	7802	<p>Background: In Section 9.3.8.2, Item g., for pipe with an outside diameter greater than or equal to 2.375 in. (60.3 mm), slag inclusions shall be considered a defect if the aggregate length of ESI and ISI indications exceeds 8% of the weld length.</p> <p>Question 1: Does this mean you have to have both ESI and ISI for Item g. to apply?</p> <p>Question 2: If I have a 3 in/0.216 in. weld with 1 in. of ESI, I should interpret it using Item a. only, correct (I would accept the weld)?</p> <p>Question 3: If I have a 3 in/0.216 in. weld with 1 in. of ESI and 1/8 in. of ISI, I should interpret it using Item g. (I would reject the weld due to the 8% rule)?</p> <p>Question 4: If a piece of slag was over ½ in. not in the root pass (not wagon tracks) I should interpret it as ESI, correct?</p>	<p>Response 1: No.</p> <p>Response 2: No.</p> <p>Response 3: Yes; Items a. through g. apply for all cases.</p> <p>Response 4: Yes, if the slag presents as ESI (usually found at the fusion zone) in the RT media then it would be interpreted as ESI regardless of location within the weld.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	22	9.3.8.2	9029	<p>Background: For pipe with a specified OD greater than or equal to 2.375 in. (60.3 mm), Item g) states that a slag inclusion shall be considered a defect when more than four ISI indications with the maximum width of 1/8 in. (3 mm) are present in any continuous 12-in. (300 mm) length of weld.</p> <p>Question 1: Is any ISI width less than 3 mm and more than four indications found in any continuous 12-in. (300 mm) length of weld considered a defect?</p> <p>Question 2: Regardless of width, if more than four indications are found in any continuous 12-in. (300 mm) length of weld having up to 3 mm width, is that considered a defect?</p> <p>Question 3: Should any ISI only 3 mm in width be considered a defect?</p> <p>Question 4: Should any ISI less than 3 mm be considered in this criterion (i.e. 2 mm, 1 mm)?</p>	<p>Response 1: Yes.</p> <p>Response 2: Yes.</p> <p>Response 3: No. 9.3.8.2(g) considers all widths up to 3 mm. 9.3.8.2.(f) considers indications greater than 3 mm.</p> <p>Response 4: Yes. 9.3.8.2(g) considers all widths up to 3 mm.</p>
1104	21	9.3.9.2	1104-I-1113-15	<p>I would like some clarification on section 9.3.9.2 lines A. and B. I have some colleague's that is telling me that the 25% of wall thickness is only used if you are joining two different thicknesses of material. I think that is not true If I have some 1/8" wall joining to another 1/8" wall material and if I have an 1/8" diameter porosity thin there will not be any weld metal covering the porosity.</p> <p>Question: Does the 1/8 in. fall in place after the wall thickness reaches 1/2 in.?</p>	<p>Your question was sent to the 1104 Committee / NDE Subcommittee for review and redress. The NDE subcommittee, as a result of this review, has proposed a technical change to the document that would address your question. However a technical change proposal to the document requires approval by ballot before it can be released. We expect to ballot and issue this revision by early 2016 as part of Addendum 2 to API 1104, 21st Edition.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	9.3.9.4	8631	<p>Background: The standard defines hollow bead (HB) in section 9.3.9.4 before stating its acceptance criteria: "elongated linear porosity that occurs in the root pass". The definitions for elongated porosity and linear porosity are stated in AWS A3.0-2010, which defines linear porosity = aligned porosity = "A localized array of porosity oriented in a line" (A3.0-2020 redefines as "A grouping of porosity forming an approximately linear pattern). Based on the above, a single elongated pore doesn't comply with HB definition of section 9.3.9.4 because it cannot define an orientation or a pattern.</p> <p>Question 1: Does an individual elongated pore (unrelated with other pores) that occurs in the root pass, complies with HB definition of section 9.3.9.4?</p> <p>Question 2: Should an individual elongated pore (unrelated with other pores) that occurs in the root pass, be evaluated and accepted or rejected based on HB definition of section 9.3.9.4?</p> <p>Question 3: Should an individual elongated pore (unrelated with other pores) that occurs in the root pass, be evaluated and accepted or rejected based on acceptance criteria of individual porosity?</p>	<p>Response 1: Yes.</p> <p>Response 2: Yes.</p> <p>Response 3: No.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	20	9.3.9.4	9972	<p>Background: The standard defines hollow bead (HB) in section 9.3.9.4 acceptance criteria: "elongated linear porosity that occurs in the root pass". Sections 9.4 and 9.5 for MT and PT define linear indications as those in which the length is more than three times the width. There is no such statement or definition in the RT acceptance criteria for Hollow bead (HB) length/width requirements.</p> <p>Question 1: For RT acceptance criteria, is a porosity indication clearly in the root always considered hollow bead?</p> <p>Question 2: For RT acceptance criteria, does a porosity indication in the root have to meet the "linear" requirement stated in other sections of the standard (9.4.1.3 & 9.5.1.3), "Linear indications are those in which the length is more than three times the width" to be considered hollow bead?</p> <p>Question 3: For RT acceptance criteria, if a porosity indication is located in the root and is elongated but the length does not exceed three times the width, is it considered "elongated linear" as defined in 9.3.9.4?</p>	<p>Response 1: No.</p> <p>Response 2: No.</p> <p>Response 3: No</p>
1104	22	9.4.2	8845	<p>Background: Referencing Section 9.4.2 - Acceptance Standards - "Rounded indications shall be evaluated according to the criteria of 9.3.9.2 and 9.3.9.3 as applicable".</p> <p>Question 1: Section 9.3.9.3 refer to Hollow Bead Porosity which is not applicable for Magnetic Particle Testing. In previous edition 9.3.9.3 refers to Cluster Porosity hence can we consider the same for acceptance in our Magnetic Particle Procedure?</p> <p>Question 2: In Fig 20 and Fig 21 there is no aggregate length on which the porosity needs to be considered. In this case can we consider the same 300mm length of weld (As per previous edition) for which the figure will be applicable</p>	<p>Response 1: No. Hollow Bead (9.3.9.3.) does not apply for magnetic particle testing. This will be considered for removal by the committee.</p> <p>Response 2: No. There is no aggregate length consideration in Fig 20 and 21. They are examples</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	22	9.5.2	8738	<p>Background: Section 9.5.2, in previous editions of API STD 1104, references sections 9.3.9.2 (individual or scattered porosity (P)) and 9.3.9.3 (cluster porosity (CP)) for liquid penetrant testing evaluation of rounded indications. The 22nd edition of API 1104 also references sections 9.3.9.2 and 9.3.9.3; however, section 9.3.9.3 in the 22nd edition relates to hollow bead (HB) porosity, and criteria for cluster porosity (CP) appears to have been eliminated entirely.</p> <p>Question: Was it the committee's intent to entirely eliminate acceptance criteria for cluster porosity (CP) with regards to liquid penetrant testing (PT), magnetic particle testing (MT) and radiographic testing (RT)?</p>	Yes.
1104	20 & 21	10	1104-I-1115-17	<p>Background: For a 48" x 24.1 mm API 5LX70 pipe to Induction bend, there is a qualified welding procedure, (SMAW root to cap); qualified on pipe to Induction bend (X70). After RT, a defect was revealed requiring a full penetration repair. Also, there is qualified repair welding procedure, (GTAW root, HP, fill 1, 2 & 3 - SMAW (fill & cap)).</p> <p>Question: In accordance with the 20th and 21st editions of the standard, does the repair procedure (GTAW + SMAW) qualify a full penetration repair to the original weld (SMAW)?</p>	For API 1104 (20th Edition), Yes, provided the requirements of Section 10.2 have been met. For API 1104 (21st Edition), Yes, provided a full thickness repair welding procedure was properly qualified per Section 10.3.

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	10.2.3	8468	<p>Background: ASME Codes for pipeline construction such as B31.4 and B31.8 address the requirement for welding procedure qualification and welder qualification in accordance with either of the welding code such as API 1104 or ASME Sec. IX.</p> <p>But when referring to repair section of both codes (B31.4 Section 434.8.7b and B31.8 Section 827), they are emphasizing repair shall be in accordance with API 1104. API 1104 section 10 have some additional requirements for repair welds which usually are not described by any other codes. My referenced discussion in this context is related to API 1104 section 10.2.3 (a), in my understanding When production welding is performed with welding procedure qualified to ASME Sec. IX they can be used for repair welding of the same joints.</p> <p>Neither API 1104 required hardness testing of HAZ for initial weld and first repair with same Welding Procedure nor ASME Sec. IX. HAZ hardness is significant in API 1104 which normally need to be carried out during repair procedure qualification of double repair or for qualification of procedure which is different than the original weld.</p> <p>Question 1: In accordance with API 1104 Section 10.2.3 a), can any welding procedure qualified to ASME Sec. IX which is used to initially weld the joint be used to repair of the joints welded with same WPS?</p> <p>Question 2: If welders are qualified to ASME Sec. IX and who produced the welds with ASME qualified WPS, can they perform repair of the joint without any additional qualification test per API 1104?</p>	<p>Response 1: Because this question is based on sections found in ASME B31.4 and B31.8, it should be directed to those code committees. API only issues interpretations on API standards.</p> <p>Response 2: No.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	10.2.3	1104-I-0310-17	<p>Background: Butt welds were made using a WPS and PQR satisfying the requirements of Section 5.</p> <p>Question 1: Is it correct to assume that the same procedure used for the original weld can be used to make the repair weld?</p> <p>Question 2: In my opinion, I think the answer is "NO" since based on Table 5, the Macro/Hardness Test (Charpy Impact Test) is not a qualification requirement. Do you agree?</p>	<p>Response 1: Yes, the original welding procedure may be used to repair so long as the requirements of 10.2.3 are satisfied.</p> <p>Response 2: No, the WPS used to make the original weld does not need to be tested in accordance with Table 5.</p>
1104	21	10.2.3c 10.4.1	1104-I-0226-16	<p>Background: API 1104, Section 10.4.1 in the second sub-paragraph requires that a welder performing a repair on a weld using a qualified repair procedure "...shall be qualified using the applicable qualified repair procedure."</p> <p>Question: In accordance with API 1104, Section 10.2.3, c), if a company does not require repair procedures for defects other than cracks and if neither a) nor b) are applicable, is a repair procedure required?</p>	No

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	10.3	7646	<p>A production weld (A) on API 5L X52 material was qualified by using a SMAW process with E6010 and E7010-P1 electrodes in uphill progression for root and hot passes respectively and E8045P-H4R electrode in downhill progression for the remaining passes. A full thickness repair procedure (B) on API 5L X52 material was qualified according to section 10.3.3 of API 1104 by using a SMAW process with E6010 and E7010-P1 electrodes in uphill progression for root and hot passes respectively and E7018-H4R electrode in uphill progression for the remaining passes. This full thickness repair was made on an original weld (C) on API 5L X52 material welded using a SMAW process with E6010 and E7010-P1 electrodes in uphill progression for root and hot passes respectively and E7018-H4R electrode in uphill progression for the remaining passes.</p> <p>Question 1: If all the essential variables specified 10.3.5 are met, can the full thickness repair procedure (B) be used as a repair procedure for a production weld (A) even if the full thickness repair procedure (B) has been qualified on an original weld (C) different from (A)?</p> <p>Question 2: Can a weld repair procedure qualified according to section 10.3.3 of API 1104 be used for repair production joints independently of the original weld on which the repair qualification has been carried out, provided that all the essential variables specified on section 10.3.5 of API 1104 are met?</p>	<p>Response 1: This situation is not specifically addressed in the 21st edition of API 1104. This will be clarified in the 22nd edition.</p> <p>Response 2: Yes.</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	10.3	8646	<p>Background: As per Clause 10.3, the repair procedure qualification test has been performed for full thickness repair/external partial thickness repair and cover pass repair on a single test coupon with the pipe diameter of 10" and pipe thickness of 6.35 mm. The repair welding process used for full thickness repair is GTAW + SMAW, and only SMAW is for partial thickness & cover pass repair. The mechanical test requirements have been carried out, as per Table 5, and NDT also (Radiography) done in accordance with Section 9, for each repair type, including hardness, macro, and impact tests. All the mechanical tests and NDT (radiography) were passed successfully for the said three repair PQR's.</p> <p>Question 1: Is the welder who successfully performs the repair PQR's mentioned above, qualified automatically with in the qualification limits given in 10.4.3?</p> <p>Question 2: If the answer is NO, is it required to conduct any additional mechanical or NDT test for the qualification of welder who performed the repair PQR?</p>	<p>Response 1: No</p> <p>Response 2: Yes; see Table 7.</p>
1104	21	10.3.3	1104-I-0303-17	<p>Background: A welding repair procedure ("A") is qualified (SMAW process) according to API 1104, paragraph 10.3.3 - full thickness, with a successful outcome. Note: The pipe materials are the same in all cases, and repairs were carried out in approved welds, according to API 1104, paragraph 5.5.</p> <p>Question 1: It is correct to apply the repair procedure ("A") in a weld made with a combination of processes (SMAW / FCAW) without qualification according to API 1104, paragraph 10.3.3 - full thickness?</p> <p>Question 2: It is correct to apply the repair procedure ("A") in a weld made with a combination of processes (SMAW / FCAW) with qualification in accordance with API 1104, paragraph 10.3.3 - full thickness (since it originally had a successful outcome)?</p>	<p>Response 1: Yes</p> <p>Response 1: Yes</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	22	10.3.4	9821	<p>Background: We are qualifying a repair PQR for base metal API 5L X52. As per para 10.3.4 of API 1104, we understood that Table 9 to be referred for the essential variables. As per Table 9, base metal is not an essential variable for repair Welding procedure qualifications.</p> <p>Question 1: Do we need to refer Table 1 & 9 together, while qualifying a repair welding procedure?</p> <p>Question 2: Basically, can we qualify the higher grade base metals (API 5L X60, 65 etc.), using API 5L X52, until there is no change in 10.3.4.1 (Filler metal or Welding Process)?</p>	<p>Response 1: Yes, Section 10.3.4 says to use Table 1 and 9 together; see 5.4.2.2(a).</p> <p>Response 2: This question is not sufficiently clear to allow API to respond.</p>
1104	22	10.3.6.1	9435	<p>Question: Is hardness testing required for qualification of double repair welds when the original weld procedure has no hardness requirements?</p>	No.
1104	21	10.4	1104-I-0405-15	<p>Background: For the qualification of welders to repair the item 10.4 provides that these must be qualified using a completed weld to make a repair weld following all the details of the repair procedure. The repair weld shall be deposited in the fixed position on a segment of a full- circumference test weld for each repair type to be qualified in the location(s) specified by the company, by performing destructive testing requirements in 6.5 are for qualification of a repair welder, except that test specimens shall be cut from the joint at each individual repair area location for each type of repair.</p> <p>Question: Due to the high cost involved in qualifying a welder by destructive testing, is this case applied the provisions of item 6.6.1, "At the company's option, the qualification butt weld may be examined by radiography or automatic ultrasonic testing using a qualified NDT procedure in lieu of the tests specified in 6.5" ?</p>	No. Repair welders must be qualified by destructive testing. The provision for qualifying welders by nondestructive testing in 6.6.1 does not apply to repair welder qualification.

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	10.4.1	1104-I-1126-19	<p>Background: Repair Welder Qualification 10.4.1 General " The repair weld shall be made by a qualified welder experienced in methods used for repair of a defective weld. The welder shall be qualified according to the requirements of 6.2 or 6.3 in addition to the requirements of this section".</p> <p>Question: Does this mean that the welder to be qualified for repair has to be tested on single qualification and multi-qualification in order to have repair qualification?</p>	No. The requirements of 10.4.1 are meant to be applied independently from previous sections and any qualifications from those sections.
1104	21	10.4.1 10.4.3	1104-I-0307-18	<p>Background 1: 10.4.1. states that the welder shall be qualified according to the requirement of 6.2 or 6.3 in addition to the requirement of Section 10.</p> <p>Question 1: 10.4.3. does not indicate limits for the grouping of OD. Does this mean that the grouping of 6.2.2.(d) apply also for repair welder qualification as per 10.4?</p> <p>Background 2: 10.4.3.(b) states that a change in filler metal group (see table 1) constitutes an essential variable and the welder shall be requalified.</p> <p>Question 2: Does this mean that a welder qualified with group 1 filler metal (E6010 or E7010) is not qualified for welding with group 2 filler metal (E8010 or E9010)?</p> <p>Question 3: Is it possible to apply requirements of 6.2.2.(c).?</p>	<p>Response 1. Yes.</p> <p>Response 2. Yes. Refer to 10.4.3(b) where a change in filler metal group is an essential variable.</p> <p>Response 3. No</p>

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Standard	Edition	Section	Inquiry #	Question	Response
1104	21	10.4.2	1104-I-1124-15	<p>Background: In API 1104, Section 10.4.2 (Testing of Repairs), for a repair welder qualification test weld, the repair weld shall meet the visual examination requirements of API 1104, Sections 6.4 and 10.3.7.2. The destructive testing requirements in API 1104, Section 6.5 are for qualification of a repair welder, except that test specimens shall be cut from the joint at each individual repair area location for each type of repair. The total number of specimens and the test to which each shall be submitted are shown in Table 7.</p> <p>A) In Table 7, It is not required. B) In Section 6.5 (Destructive Testing), It is not required. C) In Section 10.3.7.2 (Macrosection/Hardness Tests), It is required.</p> <p>Question: Is the test specimen preparation for macrosection necessary to repair welder qualification?</p>	No, API 1104, Section 10.4.2 should not reference Section 10.3.7.2. An erratum shall be issued to correct this error.
1104	21	10.4.2	1104-I-1136-15	<p>Background: API 1104, 21st edition states in Section 10.4.2 that the repair weld shall meet the visual examination requirements of 6.4 and 10.3.7.2.</p> <p>Question: Does this mean that we have to extract at least one specimen for macrosection regardless that Table 7 in which the macrosection is not requested?</p>	No, API 1104, Section 10.4.2 should not reference Section 10.3.7.2. An erratum shall be issued to correct this error.
1104	21	10.4.3	1104-I-0404-15	<p>Background: Section 10.4.3 references welder qualification limit and refers to a test described in 10.4.3.</p> <p>Question: Should the test references be 10.4.1, not 10.4.3?</p>	Yes, an erratum will be issued.
1104	21	10.4.3a & 10.2.3a	1104-I-0311-17	<p>Question 1: Is it allowed by this code to use WPS 1st repair (full thickness) to qualify a welder for 2nd repair (partial thickness), since we only want to see the welder's soundness during qualification and refer to clause 10.4.3 (a) which only mentions the type of repair and does not mention whether it is 1st repair or 2nd repair?</p> <p>Question 2: Is it still allowed by this Code if my company decides to use the original WPS to do the 1st repair weld (refer to clause 10.2.3 (a)) and then we just qualify WPS for 2nd repair?</p>	<p>Response 1: Yes, the welder qualification does not depend on the first or second repair.</p> <p>Response 2: Yes, provided the restrictions identified in 10.2.3 are satisfied.</p>

API Std 1104 Interpretations - Welding of Pipelines and Related Facilities

Last update: May 2024

Standard	Edition	Section	Inquiry #	Question	Response
1104	21	10.5.3.1	1104-I-0304-17	<p>Background: A welding method ("A") is qualified according to API 1104, paragraph: 10.5.3.1. SMAW process was used in all the pass (the first pass upward progression and subsequent progression downward, with satisfactory return results).</p> <p>Question: If I qualify a welding procedure according to API 1104, paragraph 5.4.2, welding was done with the SMAW process (first and second pass with filler material group 2), (down) and the rest with FCAW filler material group 9) process (downward). His result was satisfactory The repair was carried out with the procedure ("A"), mentioned above. His result was satisfactory. Is this correct?</p>	The question does not provide sufficient detail to provide a yes or no response.
1104	21	10.6	1104-I-0121-19	<p>Background: According to a part of paragraph 10.6 Acceptance criteria that states the following: "Repairs shall be considered acceptable when the repair area meets the standards of acceptability of Section 9 or more stringent acceptance criteria specified by the company". Now in the case of the standard of acceptability of Section 9: given the following: a section of welding of 300 mm in length find two Inadequate Penetration Without High-low (IP) of 25 mm in length separated from each other for example by 150 mm.</p> <p>Question: If one of the aforementioned indications is repaired, leaving the other 25 mm in length, the welding is acceptable, without it being necessary to eliminate the other indication of 25 mm in length, because is not defect. Is the interpretation of the mentioned paragraph correct?</p>	<p>Yes.</p> <p>NOTE: This topic is currently under review by the committee. New, proposed language may result in requirements that could change these replies based on the next edition of API 1104.</p>

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1104	22	11.1	9470	<p>Background: A company is currently using a system that sits on a band and scans the weld using an x-ray tube and DR panel to produce a DWE/SWV. The panel stops approximately every 6 in. and takes a radiography, then continues to scan the weld repeating the process until completion. There are approximately 14-17 images depending on pipe size that are stitched together and viewed as one continuous image. They currently have 4 IQI's equally spaced around the pipe in their procedure.</p> <p>Question 1: Is this method considered static when the source of energy stops at specific intervals where the image is captured?</p> <p>Question 2: Is this method in-motion?</p>	<p>Response 1: Yes.</p> <p>Response 2: No.</p>
1104	20 & 21	11.1.3.1	8422	<p>Background: Section 11.1.3.1 states that to find the minimum distance between source focal spot and the source side of object being radiographed to use the formula $D = St/k$, whereas k is defined as 0.02 in. for material thickness less than or equal to 2 in. The code does not address any material thickness greater than 2 in.</p> <p>Question: Does API 1104 use the industry standard of greater than 2 in. through 3 in. with a factor of .030 in.; greater than 3 in. through 4 in. with a a factor of .040 in.; and greater than 4 in. with a factor of .070"?</p>	No; this is not addressed in API 1104.
1104	20 & 21	11.1.6.1	8235	<p>Background: Originally, Section 11.1.6.1 requires two IQIs for film where areas to be interpreted are greater than 5 in. The IQIs are to be placed one in the center of the area and the second 1 in. from the end of the film.</p> <p>Question: If we center up on the repair area (which was not in the center of the film in the original radiograph) our process is to place only two IQIs one in the center of the film (repaired area) and the second 1in. from the end of the film. Is this acceptable, or do we need to add a third IQI?</p>	No; an additional IQI is required in the 20th and 21st editions.

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1104	21	11.1.6.1 a)	1104-I-0620-16	<p>Background: Section 11.1.6.1 a) third sentence, has added the words "or multiple films" to the section which would infer that when performing a SWE/SWV (panoramic exposure) in a single exposure using multiple overlapping films, two IQI would have to be placed on each film length over 5". One IQI center and one IQI within one inch of the end of the area of interest. This would require an inordinate amount of IQIs placed around the circumference of large diameter pipe which in no way would prove greater sensitivity than placing four IQI evenly spaced around the circumference of the pipe as stated in sentence one of 11.1.6.1 a), or by placing one IQI center of each overlapping film.</p> <p>Question: Is this in error or is this the intent of the code?</p>	<p>No. The standard, as worded currently, requires two IQIs on each film length greater than 5 inches.</p> <p>NOTE: The 1104 NDT Subcommittee is currently evaluating Sections 9 and 11 for the upcoming 22nd Edition of the document. This subject is to be discussed at the next meeting.</p>
1104	21	11.1.6.1.a	1104-I-0106-19	<p>Background: A 3rd party NDE company is performing an audit of RT's that were performed by another NDE company. The auditor is claiming that the film is unacceptable due the "essential wire" not being within an inch of the interpreted film length. Our Level II, and Level III, along with the RT company, believe that the code is referring to the IQI pack (any wires or labeling info in the pack) being within an inch of the edge of the interpreted film length, if the pack still meets the requirement of going completely across the weld. The code states this in reference to the IQI. One shall be within 1 in. (25 mm) of the end of the film length to be interpreted and the other shall be at the center of the film.</p> <p>Question: Since the code does not state that the "essential wire" be within one inch, are we permitted by code to use the any part of the IQI to achieve the measurement of less than 1"?</p>	Yes.
1104	20 & 21	11.1.6.1a	1104-I-0419-18	<p>Question: Pertaining to the text "When a repaired weld is radiographed, an additional IQI shall be placed across each repaired area", is this also required on film lengths less than five inches in length??</p>	No. Unless otherwise specified by the organization's procedures, when the film length to be interpreted is 5 in. (130 mm) or less, one IQI is all that is required. This applies to repaired welds as well.
1104	21	11.4.5	1104-I-1123-17	<p>Question: When NDT PAUT Inspections are being performed on new connector forgings to new 5L Line pipe welds, does the PAUT calibration reference standard have to be of the same pipe OD grade and thickness?</p>	<p>Yes, the AUT calibration reference standard requirement, that is cited in API 1104, Section 11.4.5, is to match the pipe OD grade and thickness.</p> <p>NOTE: API 1104, 21st Edition does not recognize the acronym PAUT.</p>

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1104	21	A.3.2.3.3	1104-I-0107-19	<p>Background: Within the statement below given in 1104 Appendix A Para A.3.2.3.3 we have had cases where the laboratory testing the CTOD samples report the final results taken from the first perceived first pop-in event regardless of how small or deemed insignificant to BS 7448. Statement below from A.3.2.3.3: Care should be taken to measure from the point of first attainment of maximum load. "Pop in cracking" must be considered the controlling event if any load drop occurs.</p> <p>Question: With regards to Pop-in events only: Is it the intention of appendix A.3.2.3.3 to ignore pop-in events with force drop and displacement increases deemed insignificant by BS 7448 and only report the CTOD values taken from pop-in events seen as significant event by the BS 7448?</p>	<p>API does not provide guidance on "intent". The requirements of BS 7448: Part 2 apply to a load drop noted during testing.</p> <p>NOTE: This topic is currently under review by the committee. New, proposed language may result in clarification of the text that could change this Response based on the next edition of API 1104.</p>
1104	22	A.3.4.2.3	9814	<p>Background: Recently we carried out one procedure qualification with impact test requirement. Per company specification, the average value of absorbed energy for each set of 3 specimens is 45 J and any one specimen will be 34 J and material is API 5L X-65. During the testing we found the values as 44J, 44J and 50J. Average we received 46 J, however, 2 specimens were found to be less than average.</p> <p>Question 1: Are these results acceptable as both specimens are greater than the minimum value and the average is more than required?</p> <p>Question 2: Is this considered failed test since the two specimen values are less than the average even though the average value is more than the requirement?</p>	<p>Response 1: Yes.</p> <p>Response 2: No.</p>

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1104	22	A.3.4.2.3	9823	<p>Per Clause A.3.4.2.3 absorbed impact energy average of 3 specimen is 40 J and minimum individual absorbed energy for each set of three specimen equals 30 J. In our PQT we received in one set of three specimens as 39 J, 39 J and 45 J respectively. Average as 41 J and minimum 2 specimen 39 J.</p> <p>Question: Per Clause A.3.4.2.3, are these results are acceptable, or if two individual values are less than average value then retest to be carried out as per clause A.3.4.2.4?</p>	Yes.
1104	22	A.5.1.6	9087	<p>Background: Section A.5.1.6, Transverse Planar Imperfections, states "Transverse planar imperfections shall be repaired or removed". The term "Transverse" here must mean transverse to the girth weld, i.e. axial. If "transverse" means circumferential, then it would negate the whole objective of this annex which is fracture mechanics assessment of circumferential weld flaws.</p> <p>Question: Does "transverse" in A.5.1.6 refer to transverse to the girth weld, i.e. axial planar imperfections?</p>	Yes, transverse to the girth weld.
1104	22	Table A.1 Table A.2	9979	<p>Background: Table A.2 references section A.3.2.5 (Table A.1). In the Table A.1, there is no section A3.2.5, the table goes from A3.2.4 to A3.2.6.</p> <p>Question:</p> <ol style="list-style-type: none"> 1. Is it intentional to not have a section A.3.2.5 in Table A.1? 2. If the answer is no, is the missing section A3.2.5 covering welding consumables? 3. If the answer to question 2 is yes, should one follow the guidance on the API 1104 21st Edition, Annex A section A3.2 f) as essential variable for welding consumable until the issue is resolved? 	<ol style="list-style-type: none"> 1. No. 2. Yes. 3. See errata 1 for resolution.

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1104	21	B.2.3.1.1	7854	<p>Background: In Section B.2.3.1.1, an increase in the carbon equivalent above that of the material used for procedure qualification constitutes an essential variable, except as provided below.</p> <p>A procedure may be used for higher carbon equivalent materials than the material used for procedure qualification provided that the thermal conditions are less severe than the procedure qualification conditions and no increase in the risk of hydrogen cracking results.</p> <p>Question 1: Is this requirement applicable for run pipe only?</p> <p>Question 2: Is it applicable for sleeve or branch carbon equivalent as well?</p> <p>Question 3: How does the less severe thermal conditions affect the CE requirement? For example if the cooling time is 10 seconds slower how much CE increase is acceptable?</p>	<p>Response 1: No.</p> <p>Response 2: Yes, the requirement applies to the carrier pipe and branch/sleeve.</p> <p>Response 3: API does not provide consulting on the use or application of its standards.</p>

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1104	21	B.2.3.2.3	1104-I-1111-19	<p>Background: We are going to qualify welder to weld in-service fillet weld of pipe to sleeve weld. Section B 2.3.1.3 clearly identified that in-service weld, pipe wall thickness is not an essential variable but it is not clearly identify on welder qualification essential variable if fillet weld welder qualification thickness is essential variable or not if welder perform fillet weld joint test of pipe to sleeve.</p> <p>Question 1: If the welder performed fillet weld test coupon of pipe to sleeve that has an OD greater than 12.750 inch wall thickness of pipe is 12 mm and thickness of sleeve is 25 mm with simulated flow or cooling by water inside the pipe according to an in-service welding procedure qualified to Appendix B, would this welder be qualified to weld in-service fillet weld in all diameter and all thickness?</p> <p>Question 2: Is pipe and/or sleeve thickness consider as essential variable on welder qualification test for in-service fillet weld test.</p> <p>Question 3: Are essential variables as per para 6.2.2(e) applied for In-service welder qualification as per Annex B at all for both long seam and fillet weld?</p>	<p>Response 1a: Yes. If the welder has a multiple qualification to Section 6.3 using the same welding process filler metal group plus any qualification test in Annex B using the same filler metal group process and direction, then the welder is qualified for making welds onto in-service piping of all diameters and thickness.</p> <p>Response 1b: No. If the qualification is to Section 6.2.</p> <p>Response 2: Yes.</p> <p>Response 3: Yes. When conformance to Annex B is claimed, the first paragraph of Section B.3.1 states that the welder should be qualified per 6.2, which includes descriptions of thickness limits.</p>
1104	21	B.2.3.1.1	1104-I-0306-18	<p>Question: If the thermal conditions remain same as per PQR, can one use the pipe with higher CE values in PQR? For example, existing pipe in facility has CE as 0.38. The pipe used during PQR has CE as 0.30. If thermal conditions are simulated during PQR, can I use pipe with CE as 0.30 for PQR and use the qualified procedure to weld the pipe with CE as 0.38 or shall I have to procure pipe with CE as 0.38 or more?</p>	<p>No. Refer specifically to API 1104, Section B.2.3.1.1, "A procedure may be used for higher carbon equivalent materials than the material used for production qualification provided that the thermal conditions are less severe than the procedure qualification conditions and no increase in the risk of hydrogen cracking results."</p>

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1104	21	B.2.5	1104-I-0302-17	<p>Background: Specification requires testing samples to be extracted as per table B.1 & figure B.3 for procedure qualification. My interpretation is that samples extraction as per figure B.3 can only be used for procedure qualification using single welder i.e. if both upper and lower sleeve have been welded by same welder and both longitudinal seams have been welded by same welder. If we take samples as suggested by figure then both welders must be used in combination always. If these joints are welded by each welder, then each joint must be tested separately and fully as procedure qualification. Further specification does not call for welder qualification of branch and sleeve welds in Appendix B.</p> <p>Question: Considering a weld procedure qualification, out of 2 sleeves as per joint configuration requirement of spec, if one sleeve is welded by one, Should I do a total of 4 Nick Breaks, 4 Bends and 4 Macro tests? Or I should do 8 Nick Breaks, 4 Bends and 8 Macro tests? If I do 4 Nick Breaks, 4 Bends and 4 Macro tests only from locations as specified, are both welders qualified along with procedure? If yes, can be they be used in combination with other welders or they must always be used in same combination?</p>	Question is not sufficiently clear for the Committee to reply. You have not clearly defined which part of your question pertains to procedure qualification and which part pertains to welder qualification.
1104	22	B.3.1	9616	<p>Background: Clause B.3.1 g) 1) states: "An in-service welder who qualifies depositing a fillet weld on a pipe and sleeve in the horizontal or inclined 45° from the horizontal position, or a pipe in the horizontal or inclined 45° from the horizontal position with the branch positioned on the side of the pipe, the bottom of the pipe, or any location between the side and bottom of the pipe, is qualified for all positions."</p> <p>Question: Does this mean an in-service welder who qualifies depositing a fillet weld on a pipe and sleeve with pipe axis horizontal and weld position 5F is qualified for all positions?</p>	Yes, for fillet welds only, per B.3.1 d) 1).

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1104	21	B.3.3	1104-I-0105-19	<p>Background: We have a concern with the API 1104 21st Edition (2014) section B3.3. For weld deposition welders, the minimum number of specimens and tests to which they should be subjected is shown in table B.1.</p> <p>Question 1: Does weld deposition welders refer to repair welders only?</p> <p>Question 2: Does weld deposition refers to any welder that makes a weld deposit on a butt weld or fillet weld?</p> <p>Question 3: If weld deposition welder refers to repair welders only why was it stated as weld deposition repair welders?</p>	<p>Response 1. No, weld deposition welders would be limited to welders who make in-service pipeline repairs using a weld deposition repair procedure only, such as in areas of wall thickness loss.</p> <p>Response 2: No.</p> <p>Response 3. API does not address questions that ask “why” clauses were written. You are invited to attend any 1104 meeting to discuss this with the committee.</p>
1104	21	B.3.3 Table B.2	1104-I-0122-19	<p>Background: Initial certification testing of welders for in-service sleeves. Welder completes a full encirclement sleeve. 2 fillet welds and 2 long seams.</p> <p>Question 1: In reference to the total number of specimens required for the long seam, does it require 4 specimens per long seam (8 total per sleeve)?</p> <p>Question 2: Is it 4 specimens total per sleeve?</p>	<p>Response 1: No, 4 specimens per long seam are not required.</p> <p>Response 2: Yes, 4 specimens total for long seam welds per sleeve per welder are required.</p>
1104	21	B.2.5 Table B.1	1104-I-0112-19	<p>Background: My client tells me that to qualify welders according to Figure B.3 in Annex B, to take the number of specimens in circumferential welding must be governed according to numerals (Section 5.8) as evidenced in Figure 10.</p> <p>According to this and in my capacity as inspector in welding CWI, I tell my client that the number of specimens for the qualification of welder in this type of sleeve weld joint in circumferential welding should be taken according to Table B. 1 since in Table B.2 it says that for deposition weld it should be governed according to Table B.1.</p> <p>Question: If I follow what Annex B says according to the taking of specimens according to Figure B.3, must I refer to Table B.1?</p>	<p>No; Table B.1 is used for procedure qualification and WDR welder qualification – it is not applicable to sleeve welder qualification. Refer to Section B.3.3 for welder qualification to install a sleeve. This answer was provided using the 21st edition.</p>