Background

Words for the 2017 edition were revised under action 15-166, based on an inquiry received from Jay Vattapilly.

Subsequently a new question was received (see background record) which asked why there was no acceptance criteria for the macro test. The confusion appears to stem from the final paragraph which uses the term ‘Visual examination’ rather than macro-examination.

Additionally, the revised wording stated that the examination method should be in accordance with ASME Section IX QW-470. However, QW-470 only talks to etchant types for macro examination, not the examination method itself. QW-183 is a more appropriate reference.

Proposed Code Change

<table>
<thead>
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<th>Current Wording</th>
<th>Proposed Wording</th>
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<td><strong>PW-28.1.2 (b)</strong> When the material used for the nonpressure part makes the mechanical test requirements for procedure qualification and performance qualifications impracticable (i.e., insufficient material ductility), a weld test coupon may be evaluated using the macro-examination method for both groove and fillet welds in accordance with Section IX, QW-470. The test coupon may be of production configuration and shall be of sufficient length to contain a specimen for macro-examination. When heat treatment is a requirement of the WPS, it shall be considered a nonessential variable. All other Section IX variables remain. The weldable quality of the nonpressure part materials shall be verified by the macro-examination of a single cross-section of either the groove or fillet weld as in the production configuration. A groove weld may qualify a fillet weld. Visual examination of the weld metal and heat-affected zone of both the pressure part and nonpressure part material shall show complete fusion and freedom from cracks.</td>
<td><strong>PW-28.1.2 (b)</strong> When the material used for the nonpressure part makes the mechanical test requirements for procedure qualification and performance qualifications impracticable (i.e., insufficient material ductility), a weld test coupon may be evaluated using the macro-examination method for both groove and fillet welds. The test coupon may be of production configuration and shall be of sufficient length to contain a specimen for macro-examination. <strong>One face of one side of the cross section shall be smoothed and etched with a suitable etchant (see Section IX QW-470) to give a clear definition to the weld metal and heat-affected zone</strong>. When heat treatment is a requirement of the WPS, it shall be considered a nonessential variable. All other Section IX variables remain. The weldable quality of the nonpressure part materials shall be verified by the macro-examination of a single cross-section of either the groove or fillet weld as in the production configuration. A groove weld may qualify a fillet weld. <strong>Visual examination of the cross sections</strong> of the weld metal and heat-affected zone of both the pressure part and nonpressure part material shall show complete fusion and freedom from cracks.</td>
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QW-183  MACRO-EXAMINATION — PROCEDURE SPECIMENS

One face of each cross section of the five test specimens in Figure QW-462.4(a) or four test specimens in Figure QW-462.4(d), as applicable shall be smoothed and etched with a suitable etchant (see QW-470) to give a clear definition to the weld metal and heat-affected zone. The examination of the cross sections shall include only one side of the test specimen at the area where the plate or pipe is divided into sections i.e., adjacent faces at the cut shall not be used. In order to pass the test

(a) visual examination of the cross sections of the weld metal and heat-affected zone shall show complete fusion and freedom from cracks

(b) there shall be not more than $\frac{1}{8}$ in. (3 mm) difference in the length of the legs of the fillet

QW-470  ETCHING — PROCESSES AND REAGENTS

QW-471  GENERAL

The surfaces to be etched should be prepared by filing, machining, grinding, or polishing to delineate the macro-features of the specimen’s weld and HAZ after etching. With different alloys and tempers, the etching period will vary from a few seconds to several minutes, and should be continued until the desired contrast is obtained. As a protection from the fumes liberated during the etching process, this work should be done under a hood. After etching, the specimens should be thoroughly rinsed and then dried with a blast of warm air. Coating the surface with a thin clear lacquer will preserve the appearance. (Reference ASTM E340, Standard Test Method for Macroetching Metals and Alloys, or other industry-accepted standards.)

QW-472  FOR FERROUS METALS

Etching solutions suitable for carbon and low alloy steels, together with directions for their use, are sug-