MANDATORY APPENDIX VIII
ULTRASONIC EXAMINATION REQUIREMENTS FOR FRACTURE-MECHANICS-BASED ACCEPTANCE CRITERIA

VIII-410 SCOPE
This Mandatory Appendix provides requirements when an automated or semiautomated ultrasonic examination is performed for fracture-mechanics-based acceptance criteria. When fracture-mechanics-based acceptance criteria are used with the full matrix capture (FMC) ultrasonic technique, Mandatory Appendix XI shall apply.

VIII-420 GENERAL
The requirements of Article 4 apply except as modified by this Appendix.

VIII-421 WRITTEN PROCEDURE REQUIREMENTS
VIII-421.1 Requirements. Procedures shall be as detailed for the applicable ultrasonic technique.

VIII-421.2 Procedure Qualification. The procedure and applicable scan plan(s) shall be qualified using the variables established for the applicable technique(s).

VIII-423 PERSONNEL QUALIFICATIONS
Only qualified UT personnel trained in the use of the equipment and who have passed qualification and/or demonstrated knowledge and have been trained and examined in the use of the equipment, shall conduct production scans. Participation is defined as having collected data using the setup being qualified without assistant. Personnel who approve setups, perform calibrations, and analyze and interpret the collected data shall be a Level II or Level III who have documented training in the use of the equipment and software used. The training and demonstration requirements shall be addressed in the employer’s written practice.

Table VIII-421
Requirements of an Ultrasonic Examination Procedure for Fracture-Mechanics-Based Acceptance Criteria
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VIII-430 EQUIPMENT

VIII-431 INSTRUMENT REQUIREMENTS
The ultrasonic examination shall be performed using a system employing automated or semiautomated scanning with computer based data acquisition and analysis abilities. The examination for transverse reflectors may be performed manually per T-472.1.3 unless the referencing Code Section specifies it also shall be by an automated or semiautomated scan.

VIII-432 SEARCH UNITS
VIII-432.1 General. The nominal frequency shall be the same as used in the qualification.

VIII-434 CALIBRATION BLOCKS
VIII-434.1 Calibration and Scan Plan Verification. The following methods from either (a) or both (b) and (c) shall be used to verify the scan plan and examination calibration.

(a) Scanner Block. A block shall be fabricated meeting the requirements of T-434.1 and Figure T-434.2.1 except that its thickness, \( T \), shall be within the lesser of 1/8 in. (6 mm) or 25% of the material thickness to be examined and the number and position of the side-drilled holes shall be adequate to confirm the sensitivity setting of each probe, or probe pair in the case of a TOFD setup, as positioned per the scan plan in the scanner. The scanner block is in addition to the calibration block required per Article 4, unless the scanner block also has all the specified reference reflectors required per Figure T-434.2.1. For scanner block(s), VIII-467.1 shall apply.

(b) Simulator Check. A simulator check shall be used prior to and at the end of each examination or series of exams. The simulator check may use any reference block (i.e., IIW, Rompus) or any block with a known reflector(s), provided that amplitude and time base signals can be identified and correlated to the original examination calibration. The time base position, amplitude, and known reflector shall be recorded on the calibration sheet(s). Accuracy of the simulator checks shall be verified at the conclusion of each period of extended use. For simulator checks T-467.2.1 shall apply.

(c) Search Unit Position Verification. An adjustable scanner or search unit positioning system that is capable of measuring and securing the search unit shall be used...