

# **Impact of the reference defect quality on the effective reflector size**

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Acceptance tests concerning the required performance data of automated testing machines are based on the detection of artificially manufactured reference defects which are defined by the applied standards or customized specification both reflecting the typical defect type to be eventually expected. The reproducibility of the measured reflector echo in an inspection depends on the defect quality. Ultrasonically the quality of the reference defect can be deduced by its reflection characteristics. The evaluation is based on the homogeneity of the projected amplitudes of the reflection profile along the reflector axis. Apart from the reproducibility the reflector dimension plays an important role for the automated testing because it scales linearly with the required shot distance and thus impacts directly in the productivity. If the defect extension is larger than the sound field width, the defect size is typically obtained by the application of the half-amplitude method (6dB criteria). Specifications nowadays are much more stringent. In this context the limits on the defect homogeneity further increase. However, specifications on the related effective reflector size remain rather vague or are even missing completely. In this work, the theoretical limits of the effective reflector size as a function of the required reproducibility are calculated. Results will be compared to empirical data obtained by the evaluation of a large data sample. In particular, the defect quality will be linked to the achievable effective defect length. Finally, in an analogy to the classification of the reference quality with respect to the reproducibility a similar scheme for the effective defect length will be derived.