

# **Discussion of discriminability for hole-type IQI in digital and film radiography**

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The discriminability of hole-type IQI using equivalent penetrameter sensitivity (EPS) was studied for digital and film X-ray radiography with thick welded materials. The EPS is used to estimate discriminability of IQI elements with various thickness and diameter on radiography. In this study, the EPS on digital and film radiography for welds, its change by exposure amount and radiographic conditions including observation were discussed. The radiographic images of steel welds with 25 mm and 50 mm thickness of base material with hole-type IQIs were taken by IPs and films and discriminability of each IQI holes were evaluated by at least seven NDT certified personnel at dimmed and bright room, four times about every other year. The EPS of each IQI hole was calculated and evaluated for their probability of detection to each IQI hole. Their relationships were obtained by fitting to sigmoid function, and the difference of discriminability between images with digital detectors and films, and observation conditions were discussed with the EPS discriminated at 50%. As the result, in digital images the discriminated EPS decrease with increasing exposure value, and change total darkness in the image viewing area as the observation condition and the observation method including the set of window level. These approaches indicate that the EPS is useful to confirm the improvement of experiment conditions.