

Exposure Factors for Flexible Digital Detector Arrays

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Exposure factors (R factors) provide guidance in gamma radiography applications. The exposure time is calculated for a specific source type, activity, thickness of steel, desired exposure factor for a target film density or pixel value, and source-to-detector distance (SDD). R factors to produce target film densities of 2.0, 2.5, 3.0, and 3.5 were published for M100, MX125, T200, AA400, and HS800 films. Digital R factors are now published for Carestream rigid and flexible digital detector array (DDA) products. The flexible DDA's are bent repeatedly around curved surfaces for single wall viewing, as radiography codes and standards require that the detector be in direct contact with the weld whenever practical. The R factor tables are published along with the supporting data used to calculate them, which are provided in graphical format for each condition. Iridium, selenium, and cobalt radioisotope sources were utilized for the generation of the data. Radiographers utilize the tables provided to enter the R factor into a commercially available phone-based calculator to determine the exposure time required to obtain the target optical density or grey value through the base metal. R factors are meant to be a starting point only, as other factors related to the part geometry and technique impact the required exposure.