

Characteristics of Computed Radiography (CR) vs. Envision's Digital Radiography (DR)

CR

DR

Procedure	Like film radiography, CR requires exposing the cassette. The cassette is then moved from the inspection site to the reader location. The CR plate is digitally imaged, and the image is evaluated on the PC. The plate is then erased. If a re-shoot is required, the cassette is returned to the inspection site for another exposure and the process is repeated.	DR requires exposing the digital panel. Images are then immediately available for evaluation on the PC without moving the panel from the inspection site. If the image needs to be re-shot, everything is set for a new exposure. For DR scanning systems, images can be viewed and evaluated as they are being exposed in real-time.
Portability	CR cassettes are very portable. The technology excels when the technician must access difficult locations where a DR cable would be cumbersome or impractical to manage; or where it is necessary to conform the imaging plate to a curved surface. The CR reader/eraser is not portable and requires an electrical power source.	The DR panel can be field portable, depending on the panel size. The DR workstation can also be portable if it is a laptop. The complete system, such as the Envision 4x4, can be moved to the inspection site without attachment to an electrical source.
Resolution	The resolution at which the cassette is read is selectable, the highest currently available with CR is 100 microns, with new 50 micron versions available soon. The tradeoff is that the higher resolution will require more exposure time and read time. At 100 microns, from 1 to 5 minutes is required to digitize the image depending on brand. Another 1/2 to 2 minutes is needed to erase.	The resolution at which the DR panel captures is selectable, highest available with DR is the Envision 4x4 at 48 microns. At 48 microns, the time to acquire the image is typically 12 seconds. CMOS linear array systems provide 80 micron resolution and can produce image results in real-time. No erasure of CMOS DR panels is needed.
Speed	Like film, CR requires multiple steps. Turnaround time from image to image with CR is typically 2-10 minutes or more accounting for the time for taking the cassette to the reader, reading, erasing, and returning to the inspection site.	DR can provide images within a few seconds. With the Envision 4x4, the typical turnaround time from image to image is from 5 to 20 seconds.
Production Use	Like film, the multi-step process for using CR is too slow for most production applications.	DR can provide continuous inspection of hundreds or even thousands of parts per hour. Automatic defect recognition (ADR) is also an option.
Cost	CR systems require the purchase of a reader/eraser workstation with PC, display and software. Also, a supply of cassettes is required, at a total initial cost of ≈\$140K. The cassettes can be damaged in field applications and therefore must be considered a consumable item at a cost of \$400 to \$1000 each.	DR systems require the purchase of an imaging panel, cable, PC, display, and software. The total costs for a system are from ≈\$80K for Envision 4x4, to ≈\$140K for a 24" x 24" panel system. There are no consumables.
Strengths	CR excels for field operations where access is limited or the imaging plate must conform to the object shape. Also, CR is usually the best choice for use with isotopic sources.	DR excels for production applications where speed and/or image quality are paramount. Portable DR panel systems can provide immediate results in field applications. Also, DR linear arrays can provide X-ray views without parallax.