

Technical requirements for B-readers reporting chest X-rays for Queensland coal mine workers

B-reader requirements

B-readers must comply with the requirements below in order to be registered with, and to maintain registration, on the Department of Natural Resources, Mines and Energy's (DNRME) register of doctors and medical providers that offer health services to Queensland's coal mine workers.

General

1. Technical specifications and requirements for reporting chest X-rays are to be in accordance with the latest edition of the [NIOSH Guideline - Application of Digital Radiography for the Detection and Classification of Pneumoconiosis](#).
2. These guidelines will need to be adapted for use in Australia. DNRME expects the following adapted requirements will be delivered by the B-reader:
 - (a) At a minimum, the B-reader must comply with relevant requirements of the latest version of the [Royal Australian and New Zealand College of Radiologist Standards of Practice for Diagnostic and Interventional Radiology \(RANZCR SOP\)](#); and
 - (b) If the RANZCR SOP requirements conflict with any of these requirements – these technical specifications and requirements apply unless there is a sound medical reason or an equivalent or better outcome achieved
3. Examinations are to include comparative assessment with previous images where available

Image Classification (Image display)

4. Viewing software (e.g. NIOSH B-Viewer™, equivalent or superior) must be used to ensure the readers' ability to modify the appearance of the International Labour Organization (ILO) standard comparison images is limited and the specific settings used for displaying the chest X-ray images are documented.
5. To further enhance consistency when performing ILO Classification of chest X-ray images, the reader must use two side-by-side flat panel colour-matched diagnostic quality medical displays capable of monochrome display and compliant with DICOM® Grayscale Standard Display Function standard.
6. The [Commonwealth Department of Health Capital Sensitivity](#) measure is to apply, with new innovative technology acceptable if an equivalent or superior outcome is achieved.
7. The viewing devices must be of the identical make and model, displaying at a minimum 3MP at 10 bit depth.

8. Display system luminance (maximum and ratio), relative noise, linearity, modulation transfer function, frequency, and glare in relation to diagnostic imaging monitors must be appropriate for the activity for which they are used. At a minimum, the RANZCR SOP requirement for monitors¹ should be complied with for primary monitors.
9. Viewing displays must provide a maximum luminance of at least 171 candelas/meter², a ratio of maximum luminance to minimum luminance of at least 250, and a glare ratio greater than 400 (the contribution of ambient light reflected from the display surface should be included in luminance measurement considerations since some level of ambient light is always present).
10. Colour displays may be used if the devices adhere to the requirements stated above. RANZCR SOP v10.2 requirement 3.6.3 states the colour monitors must be at least a 24 bit colour display.
11. If a different display hardware and software is used, image uniformity can be maximized if image displays and associated graphics cards meet the calibration and other specifications of the current DICOM[®] standards and does not deviate by more than 10% from the grayscale standard display.

Image Classification (ILO classification process)

12. Chest X-rays that are graded ILO image quality 4 must not be reported on. These X-rays must be rejected back to the imaging clinic or referring entity and require that another image be acquired and provided.
13. Classifications must be performed using digitally-acquired posterior-anterior chest X-ray images collected and displayed in accordance with these requirements.
14. Viewing systems must enable readers to display the chest X-ray image at the full resolution of the image acquisition system, side-by-side on an identical display device with the selected ILO standard images for comparison.
15. Only authorised ILO standard digital images are to be used for classifying digital chest X-ray images for pneumoconiosis.
16. To ensure consistency in classifications of digital chest radiographs, the ILO standard images must not be modified using software tools.
17. Calibrated software measuring tools must also be used to measure the width and length of pleural shadows and the diameter of opacities.
18. Software tools whose purpose is to reduce noise, enhance edges, or restore image appearances should not be applied to the subject image.
19. The presentation state(s) that were used in performing the actual classification should be saved, if possible.

Requirements for transferring images and files to Lungscreen Australia

20. Establish a link with Lungscreen to facilitate the secure transfer of images and files.

21. The following files must be transferred to Lungscreen for each coal mine worker:

- (a) Digital chest X-ray image;
- (b) AXT and data files from B-viewer™; and
- (c) A PDF version of the completed ILO Classification report for the 1st read.

¹ Refer to [RANZCR SOP V10.2, March 2017](#).