

### ***Qualification Requirements for PET Brain (PTBR Modality)***

1. All scanners for which a site is seeking ACRIN qualification must be a PET/CT scanner. PET ONLY scanners will no longer be accepted for qualification.
2. Phantom must be a water-filled cylinder injected with  $^{18}\text{F}$ .  $^{68}\text{Ga}/^{68}\text{Ge}$  solid cylinders are no longer acceptable.
3. Uniform cylinder acquisition for trials involving PET/CT brain scans must be acquired and reconstructed on a FOV with a maximum diameter of 350 mm. A 1-bed position acquisition of a 10 minute duration is required for 3D acquisitions and a 20 minute duration is required for 2D acquisitions.

### ***Materials Required***

Submit the following for every PET/CT scanner that will be used for ACRIN research.

- a. PET Qualification Application (to be completed via QUIC upon qualification image submission)
- b. Average Cylinder SUV Analysis Excel Worksheet
- c. Uniform Phantom Images (DICOM) with Phantom Data Form(s)
- d. Two Test Patient Studies

### ***Uniform Phantom Dose Requirements***

- a. Phantom preparation:
  - i. Fill phantom with  $^{18}\text{F}$ , so that the concentration is 135 – 165 nCi/ml:
    1. For standard GE phantom (5,640 ml): 0.75 – 0.95 mCi
    2. For standard Siemens phantom (6,283 ml): 0.85 – 1.05 mCi
    3. For standard Philips phantom (9,293 ml): 1.25 – 1.55 mCi

### ***Uniform Phantom Acquisition Requirements***

- i. Brain FOV, Static Quantitative Imaging specifications:
  1. FOV Diameter = 350 mm
  2. Time per Bed Position → 10 minutes for 3D acquisition or 20 minutes for 2D acquisition
  3. Axial Extent → 1 bed position

4. Use standard reconstruction settings for clinical brain studies

***Uniform Phantom Image Submission:***

- i. Prior to image submission, site should:
  1. Check the images to ensure that they are free of artifacts
  2. Review Image Analysis SOP to better understand the analysis that will be performed by the ACRIN Core Laboratory
- ii. All image data must be sent in uncompressed standard DICOM format
- iii. For all phantom studies, the site must submit:
  1. Appropriate phantom data forms
  2. CT images used for attenuation correction
  3. PET attenuation corrected images
  4. PET non-attenuation corrected images

***Test Patient Submission***

- a. Only two test patients must be submitted for each FOV, even if a site will be apply for multiple levels of qualification
- b. Test patients should undergo FDG-PET/CT scan that were acquired following the site's standard clinical SOPs.
- c. All image data must be sent in uncompressed standard DICOM format
- d. For all test cases, the site must submit:
  1. Appropriate phantom data forms
  2. CT images used for attenuation correction
  3. PET attenuation corrected images
  4. PET non-attenuation corrected images