

Please follow all instructions carefully.

General Instructions

Please read and understand the documents listed below **before** beginning this process:

- A. *Diagnostic Modality Accreditation Program Overview*
- B. *MRI Accreditation Program Requirements*
- C. *MRI Accreditation Quality Control Manual*

You will need the following items from the ACR website (www.acr.org/accreditation):

- 1. This *Testing Instructions* Document
- 2. *MRI Accreditation Clinical Image Quality Guide*
- 3. *Phantom order form*
- 4. *Site Scanning Instructions for Use of the MR Phantom*(separate documents for large or small phantom, depending on your unit),
- 5. *MRI Phantom Site Scanning Data Form* (separate documents for large or small phantom)
- 6. *Phantom Test Guidance* booklet, which includes all measurements that will be done on your phantom data (separate documents for large or small phantom)
- 7. *Clinical Test Image Data Forms* (one for each clinical examination you submit)
- 8. *ACR MRI Quality Control Manual* (Initial application packets only)
- 9. DesAcc order form to convert phantom and/or clinical images to CD if you are unable to burn your images according to our instructions.

You will also need these items

- 10. Bar coded identification labels for all images, forms, and quality control data (sent to you by mail)
- 11. Nonmagnetic bubble level for positioning the ACR phantom (not included)

ACR staff is available Monday through Friday, from 8:30a.m. to 5:00 p.m. (ET), to answer any questions you may have about the process. The telephone number is **800-770-0145**, and the email address is mri@acr.org.

The ACR Web site (www.acr.org) has frequently asked questions (FAQ's) for all accreditation programs under the Accreditation menu. The ACR *Appropriateness Criteria* and *Guidelines and Standards* and the *ACR Guidance Document for MR Safe Practices: 2007* can also be accessed from this site under the Quality and Patient Safety menu.

There are three portions to your ACR MR Accreditation Program submission:

- 1. The Annual System Performance Evaluation and Quality Control (QC) testing
- 2. The phantom testing
- 3. The clinical image testing

Apply all instructions to every unit being reviewed for accreditation. **Every unit must apply for all modules routinely performed on that unit for a facility to be accredited.** Please see MRI Accreditation Program Requirements for "Emergency Use of Magnet". Keep this entire packet for your records, and **keep copies of everything you submit to the ACR for your records.**

You **must** utilize the services of a qualified medical physicist/MR Scientist for the Annual System Performance Evaluation. The ACR **strongly recommends** using the services of a qualified medical physicist or MR scientist during both the process of accreditation and for oversight of your site's technologist quality control program.

After your application is processed, the ACR assigns your facility a unique identification number (MRAP #). This number appears on all correspondence from the ACR, your online records and on all of the barcode labels. Please use this number on all submitted materials and to identify your facility when

contacting the ACR for assistance.

The ACR website (www.acr.org) provides a listing of accredited facilities and facilities that have applied for accreditation and are under review. If a third party payer requests verification of your participation in one of the accreditation programs, please refer them to the ACR website.

Materials due date:

The labels mailed to you have image submission due dates. You must collect your test images and return them with your completed application to the ACR by the date indicated on the labels. Failure to meet this due date will jeopardize completion of your accreditation. Thus, if your facility is renewing its accreditation, we cannot guarantee completion in a timely fashion before your ACR certificate expires. If your site cannot submit the required materials by your due date, notify the ACR **immediately**.

Image collection time period for phantom and clinical images:

No images will be accepted for review that predate the application by more than six months.

Online Application

The application for ACR MRI Accreditation is found online through the ACR website. After you submit your application online, you must log into your account, and fill out all of the forms for your Testing Package. You may print generic forms from the MRI Accreditation section of the ACR website so you can fill them out online later, but the data must be submitted online. You will then print the completed forms, and submit them along with your images to the ACR.

Annual System Performance Evaluation and Quality Control Testing

All facilities applying for accreditation or renewal must demonstrate compliance with the ACR requirements for quality control (QC) and Annual MRI System Performance Evaluation or Acceptance Testing Evaluation (for new units). The Annual System Performance Evaluation or Acceptance test must be **performed by a medical physicist/MR scientist** and the full report submitted for review, either uploaded into the online testing package or on hardcopy. All QC testing must be carried out in accordance with the written procedures and methods outlined in the *ACR MRI Quality Control Manual*.

If you have just begun conducting QC, you may perform QC testing every business day for two weeks to gather baseline data so your physicist/MR Scientist can set action limits. Additionally, if the Annual MRI System Performance Evaluation and/or weekly on-site QC data show performance deficits (e.g. problems with the system and/or data outside of the action limits), the facility must submit documents that state what steps it has taken to correct the problems. You will be prompted to provide corrective action for deficient items from the checklist in the online testing package.

Clinical Image Testing Instructions

- Read the *MRI Accreditation Clinical Image Quality Guide* – The entire first section and any tables that are pertinent to the clinical examinations you will be submitting for accreditation.
- Compare your site's protocols to those listed in the *MRI Accreditation Clinical Image Quality Guide*.
- Select examples of your best work and have them approved by your supervising physician prior to submission. Your supervising physician should review **all** materials submitted for accreditation.
- You must submit localizer or scout sequences with all examinations with cross-reference locations.
- Sites cannot submit examinations performed on models or volunteers.
- The images submitted for each individual examination must be from the same patient (i.e., all knee images must be from the same knee study) with the following exception: facilities submitting only one specialty examination for the cardiac module may submit the Black Blood and Delayed Enhanced Cine sequences from two different patients.

Spatial/Temporal Resolution Assessment:

Before the collection of any images can begin, first evaluate your clinical image spatial resolution, and compare it with ACR criteria. The *MR Accreditation Clinical Image Quality Guide* lists the formulas to determine spatial and temporal resolution. If your site determines that you need to adjust your protocols, please make changes before proceeding to the phantom testing instructions. Please be aware that further changes in clinical image spatial resolution may be warranted based on evaluation of phantom images performed during the test image collection phase.

Please note that if you make any alterations in any resolution parameters (matrix, field of view or slice/slab thickness) as a result of ACR recommendations, it will result in a modification of the voxel volume, the signal-to-noise ratio (SNR) of the image and the amount of partial volume averaging exhibited in the image. Alterations in the number of phase encoding steps (Np) affects scan time, while alterations in the number of frequency encoding steps (Nf) may affect the maximum number of slices as well as the minimum possible TE for the imaging sequence. Your site will be responsible for making any necessary corresponding changes in scan protocols to maintain image quality.

List of Parameters:

Listed below are parameters that are necessary for the reviewer to have easy access to in order to completely review your clinical images. The list is categorized as if you are submitting on hard copy film. If you are submitting your clinical images on CD, all parameters should be displayed on the image, or easily accessed through the DICOM header.

Warning: If the parameters listed below in Bold and Italics are not easily available to the reviewer, that examination will fail.

1. Each sheet

- Patient name (First and last) (Note: All patient information annotated on clinical examinations will be kept confidential by the ACR, as stated in the *Practice Site Survey Agreement*.)
- Patient age or date of birth
- Patient identification number
- Date of examination
- Study number

2. Each sequence on each sheet of film

- Type of sequence
- TR
- TE
- TI (if applicable)
- Flip angle
- ***Slice thickness***
- Trigger delay (if applicable)
- ***Interslice gap (can be inferred from slice position)***
- ***Field of view***
- ***Acquired matrix*** (number of frequency encoding steps and number of phase encoding steps – interpolation or other post acquisition enhancements should not be taken into consideration)
- Acquisition time (indicated or easily calculated)
- Size scale e.g. scored lines indicating centimeters. ***(If this information is missing from hard film submission, that examination will fail.)***
- Number of excitations
- Plan scan or scout identifying the location of each sagittal or axial slices. The location of the “plan scan” should be readable and easily related to the diagnostic images. ***(If this information is missing on spine examinations, that examination will fail.)***

3. Each image

- Location
- **Laterality (left or right, e.g. knee), left or right of midline (e.g., brain and spine studies)**
- **Label that indicate location of slice relative to other slices**
- **Number that correlates with "plan scan" or scout identifying the location for each slice**

4. Each exam

- Facility name and address

5. The following labels are not required but are strongly recommended for each sequence.

- Echo train length
- Bandwidth
- Initials or name of technologists who performed the exam

Instructions for electronic submission option:

You may submit your clinical images on 5 ¼" CD or DVD media. 3" discs are not acceptable.

Submit two (2) CD-ROMs that are identical (Each CD contains all of the examinations listed on your application). We send the CDs out simultaneously to two reviewers to shorten the turnaround time for your final report. **Images must be in DICOM format without compression. Other formats (jpeg, bitmap, etc.) are not acceptable.** Both CDs must include copies of the same four required clinical examinations, and they **must** include an embedded viewer. Once you have created the CDs for submission, you **must** open the images on the CDs and check **both** CDs for accuracy and to make sure all of the minimum requirements listed below are easily available for the reviewers.

Warning: If your embedded viewer does not meet the minimum requirements and you fail to review the images on the CD before submission to the ACR, your site may fail accreditation.

The embedded viewer **must** include functions of:

1. window/level
2. magnification
3. show cross reference lines for slice location
4. region of interest (including measurement of area, pixel mean, and pixel standard deviation)
5. distance measurement
6. access to the DICOM header

If your embedded viewer has the functionality listed above, but does not provide access to all of the parameters listed below, you may submit a film image of the data for **every** sequence in every examination you submit that shows the missing parameters.

If you are unable to burn your patient images onto a CD with an embedded viewer that meets the requirements listed above, you may contact DesAcc using the order form on the ACR website to convert the images onto a CD with a viewer that does meet these requirements.

Complete test image data forms for each required sequence of each examination you submit by logging into your online account and completing your testing package. When you choose to submit by CD, the online system will print out two copies of all of the forms because each CD will need a separate copy of the Clinical Test Image Data Forms. Include a copy with each of the two CDs you submit.

NOTE: If a unit is applying for the Cardiac module, all examinations for all modules on this unit must be submitted on CD. However, units that are not applying for the Cardiac module may submit images electronically or on film for all modules.

Instructions for hard copy submission option:

1. All images must be original (not film copies) and must be filmed using a 14 x 17 film size.
2. Collect required clinical images.
3. Film your site's clinical images using your site's filming protocol for interpretation, but making sure that all necessary parameters for review are easily discernable on the films and the images are large enough to be interpreted.
4. Complete test image data forms for each required sequence of each examination you submit by logging into your online account and completing your testing package.
5. Print the completed forms and submit with your images.

Phantom Testing Instructions

STEP 1: Scanning the ACR phantom

In order to proceed with this part of your image collection process, you must have an ACR phantom. The large phantom is scanned in the head coil, and will be the phantom used by most facilities. The small phantom is scanned in the knee coil, and only used for extremity-only units. An order form for the phantom is available on the ACR website. You may use a nonmagnetic bubble level (not included) for positioning the phantom. All the instructions you and/or your physicist will need to scan your phantom are in the enclosed *Site Scanning Instructions for Use of the MR Phantom*. When your physicist has completed your phantom scans, proceed to step 2.

Eight Channel Head Coils

If your facility uses an eight channel head coil, it is necessary to perform **all** phantom scans using the *surface coil intensity correction* option.

STEP 2: Evaluating your phantom image quality

After scanning the phantom, you and/or your physicist will use the *Phantom Test Guidance* booklet in this package to evaluate your images using the same procedures that ACR physicist reviewers will use. If the images do not pass, the physicist will inform the supervising physician, and service engineer, as corrective action may be warranted. If your site service engineer makes system adjustments and/or the supervising physician makes scan protocol changes, repeat step 1. *In order to ensure that your phantom data is accessible and passes all of the measurements the phantom reviewer will be making, you **must** download the Osiris DICOM viewer or K-Pacs DICOM viewer to a computer that is not attached to PACs and not attached to a scanner.*

Download Osiris software at: http://www.sim.hcuge.ch/osiris/01_Osiris_Presentation_EN.htm

Download K-Pacs software at: <http://www.k-pacs.net/>

Once your images pass, proceed to step 3.

STEP 3: Prepare phantom image data

Sites must choose one of the following options for submission of phantom data.

OPTION A – Digital Data Medium and Format

Digital data submission must be uncompressed, DICOM-formatted images on CD-ROM (**No DAT or MOD/ODs will be accepted**).

The CD should be in the ISO-9660 format, the most common type of data CD format. The CD should be

“write-once-read-many” kind, often referred to as CD-R or CD-Recordable. Do not use rewriteable CD’s, as they are not readable by all CD-ROM drives.

The Phantom CD that your site submits **must not have an embedded DICOM viewer** on the CD.

Store each series of films in a separate folder (directory), labeled to indicate which series it contains (i.e.: acrLoc, acrT1, acrT2, siteT1, siteT2). The individual slices should be labeled to indicate their order in the series (i.e.: img001, img002, etc.).

You may need to contact your manufacturer and/or PACS manager for clarification on your ability to save data in DICOM format or for assistance in translating your site’s media into DICOM CD-ROM format. Your site will be responsible for submitting media translated by the manufacturer to the ACR. Please note that DesAcc, Inc. is currently providing phantom data translation services for ACR accreditation applicants. If you choose to use DesAcc’s services, please contact them to obtain the most current information regarding their ability to translate your media.

If your site is **unable** to burn your phantom images to CD-ROM, please consult the following table:

Equipment Manufacturer	<u>Instructions</u>
Fonar Corporation	Please contact Customer Service at Fonar Corporation to discuss any charges that may apply for this service and to arrange for data translation of your phantom data. Tel. 631-420-4000.
General Electric, Philips, Siemens, Toshiba	Call DesAcc directly or see the attached order form for questions regarding their service and any applicable fee for data translation: Phone: 866-638-0936 E-mail: questions@desacc.com Web: http://www.desacc.com/services/ Copy your site scanning data form and send the form, your disk or tape, the order form, and a check for the applicable fee made payable to DesAcc Inc. to: DesAcc, Inc. ACR MR Accreditation 0844 SW Curry Street Portland, OR 97239 Please note that your site is responsible for sending the CD to the ACR. You should factor in phantom data translation time of two weeks in order to make the deadline on your testing labels.
Hitachi	Please contact Dawn Thompson at 1-800-800-3106 ext 3696 to arrange for data translation of your phantom data.
Philips, Picker/Marconi	Please contact Lance King at 440-483-5436 or Eugene Fatica at 440-483-5188 to arrange for data translation of your phantom data.

OR

OPTION B – On-Site Review

If you are unable to obtain a translation of your media into DICOM PC CD-ROM format by using your site’s own capabilities, DesAcc, or your manufacturer, archive the phantom data using the site’s current archive media format (i.e. MOD or tape). You must schedule an on-site review of their phantom data by an ACR physicist reviewer. You will be responsible for all expenses for travel by the ACR. The ACR cannot be held responsible for any lost revenue to the site due to the interruption of the site’s services. ***This process may cause significant delay in the completion of a site’s testing cycle.***

Complete test image data forms for each required sequence of each examination you submit by logging onto your online account and completing your testing package.

Labeling Instructions

Please take care in following these instructions: The correct labeling of your images, forms and CDs is critical to the proper identification of the materials submitted for each magnet. Incorrect or incomplete labeling can delay the accreditation process. The ACR will return your package to you if your images are not labeled properly. This will delay the accreditation process.

Special barcode labels have been prepared for each of your images and data forms. Special labels have also been provided for the film jackets. You have received labels for each type of examination, examination jacket and data form. Please do not place labels over anatomic structures. **Do not alter barcode labels in any way.**

If you run out of barcode labels, use the additional image labels included in this package. Do not make copies of the existing barcode labels. You must fill in all the blanks on each label. Retain a copy of the completed label sheet with the blanks filled in for your records. If you need additional labels, please contact the ACR.

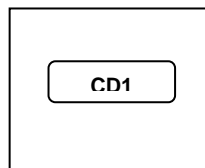
Label all forms, CD-ROM cases (**do not apply labels to your CD's**) and films submitted with the corresponding label. **Do not submit films or documents without labeling.**

Hard Copy submission of Clinical Images:

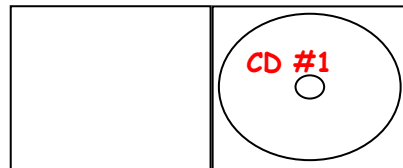
1. Place one barcode label on each sheet of film of the examination. You may have more labels than you need. If you damage a label, use the next label in the series for that examination type.
2. Place all films belonging to one type of examination in its own film jacket. You will have four to five clinical film jackets (depending on the number of modules in your application – if you are applying for the cardiac module, you cannot submit images on film), which **you must identify** with the “film jacket” label for the type of examination. You will have separate jackets for each examination.
3. Place the appropriate data form (printed from your submitted online testing package) in each film jacket.

Electronic Submission of Clinical Images:

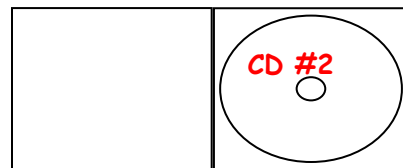
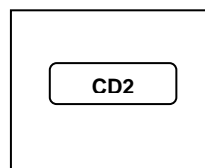
1. Place the barcode labels on the **case** of each clinical CD-ROM. Place the label “CD1” on the first CD, and put the label “CD2” on the second CD. **Do not put barcode labels on the CD-ROM.** Place the label “CD1” on the first CD, and put the label “CD2” on the second CD. **You MUST label the CD with a permanent marker if your facility does not have the ability to label it with a CD compatible label.**



Place ACR barcode label on case



Write CD # on disc with permanent marker



2. Place one copy of the *Clinical Test Image Data Forms* for each examination with each clinical image CD. **Failure to provide the additional copies may significantly delay the review process for your facility.**

The barcode labels mailed to you show when your testing materials are due to the ACR. Failure to meet this due date will jeopardize completion of your accreditation. If your facility is renewing its accreditation, we cannot guarantee completion before your ACR certificate expires.