

## DICOM Correction Item

Correction Number	CP- 173
Log Summary:	Presentation LUT Parameters: Basic Film Box versus Basic Film Session
Type of Modification	Name of Standard
Clarification	PS 3,3, 3.4 - 1999
<p>Rationale for Correction</p> <p>1. - major - Supplement 22 Final Text states that Illumination and Reflected Ambient Light are attributes of Basic Film Box, which was incorporated correctly into Part 3, but in Part 4 they are stated as attributes of Basic Film Session. See Table H.4-2 and Section H.4.1.2.1.1. According to Supplement 22, they should be in Tables H.4-6, H.4-7, and Section H.4.2.2.1.1.</p> <p>These two attributes make more sense to belong in Basic Film Box, where all the other attributes related to image quality/consistency/appearance are, so Part 4 should be updated: see Table H.4-6.</p> <p>2. - major – to be consistent with item 1, the reference to the Presentation LUT should be removed from the Film Session level also, and remain at the Film Box and Image Box level.</p> <p>3. - minor - In the 1999 Standard and Supplement 22 Final Text, the name of attribute (2010,0160) is Reflected Ambient Light in most places, but Reflective Ambient Light in one: Part 4, Table H.4-2. This is a typographic error.</p> <p>4. - minor - In the 1999 Standard and Supplement 22 Final Text, the names of attributes (0008,1150) and (0008,1155) under Referenced Presentation LUT Sequence (2050,0500) are SOP Class UID and SOP Instance UID, respectively. This occurs in Part 4, Tables H.4-2, H.4-6, H.4-7, H.4-10, H.4-12. According to Part 6, the attribute names are Referenced SOP Class UID and Referenced SOP Instance UID, respectively. The same applies to Referenced Overlay Sequence (0008,1130) in Tables H.4-10 and H.4-11. This is a typographic error.</p>	
<p>Sections of documents affected</p> <p>In PS 3.4, Sections H.4.1.1, H.4.1.2.1.1, H.4.2.2.1.1, H.4.2.2.2.1, H.4.3.1.2.1.1, H.4.3.2.2.1.1, H.4.3.3.2.1.1, H.4.9.1, H.4.9.2.1.3</p> <p>In PS 3.3, Figure 7-1b, Figure 7-2b, Section C.13.2</p>	
Correction Wording:	

*Amend PS 3.4 Annex H as follows:*

### **H.4.1 BASIC FILM SESSION SOP CLASS**

#### **H.4.1.1 IOD Description**

The Basic Film Session IOD describes the presentation parameters which are common for all the films of a film session (e.g. number of films, film destination)

The Basic Film Session SOP Instance refers to one or more Basic Film Box SOP Instances ~~and zero or one Presentation LUT SOP Instance.~~

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#### H.4.1.2.1 N-CREATE

The N-CREATE is used to create an instance of the Basic Film Session SOP Class.

##### H.4.1.2.1.1 Attributes

The Attribute list of the N-CREATE is defined as shown in Table H.4-2.

**Table H.4-2  
N-CREATE ATTRIBUTE LIST**

<b>Attribute Name</b>	<b>Tag</b>	<b>Usage SCU/SCP</b>
Number of Copies	(2000,0010)	U/M
Print Priority	(2000,0020)	U/M
Medium Type	(2000,0030)	U/M
Film Destination	(2000,0040)	U/M
<b>Illumination</b>	<b>(2010,015E)</b>	<b>U/MC (Required if Presentation LUT is supported)</b>
<b>Reflective Ambient Light</b>	<b>(2010,0160)</b>	<b>U/MC (Required if Presentation LUT is supported)</b>
<b>Referenced Presentation LUT Sequence</b>	<b>(2050,0500)</b>	<b>U/MC (Required if Presentation LUT is supported)</b>
<b>&gt;SOP Class UID</b>	<b>(0008,1150)</b>	<b>U/MC (Required if sequence is present)</b>
<b>&gt;SOP Instance UID</b>	<b>(0008,1155)</b>	<b>U/MC (Required if sequence is present)</b>
Film Session Label	(2000,0050)	U/U
...	...	...

- Notes:1. The memory allocation Attribute allows the SCU to reserve sufficient memory to store the "working" film session hierarchy as well the "copied" film session hierarchy in the Print Job in order to prevent deadlock situations.
2. Owner ID (2100,0160) is a user option for the Basic Film Session. However, SCUs that also implement the Print Queue Management Service Class are required to supply Owner ID to successfully delete or re-prioritize Print Jobs in the printer queue (see section L.4.2.3.1).
  3. Proposed Study Sequence (2130,0040) may be used to identify Stored Print Storage and Hardcopy Image SOP Instances created to store this Film Session
  4. To meet requirements specified in PS 3.3, the Study Instance UID of the Stored Print Storage SOP Instance should be the same as the Study Instance UID in Proposed Study Sequence (2130,0040). New Series Instance and Image Instance UIDs will be supplied by the device that creates the Stored Print Storage SOP Instance.

The meaning of the Usage SCU/SCP is described in Section H.2.4.

Within the film session, the allocated memory is consumed as SOP Instances are created and is freed for reuse as SOP Instances are deleted. All the allocated memory shall be released following termination of the Association or deletion of the Film Session SOP Instance.

**If the Illumination (2010,015E) and Reflected Ambient Light (2010,0160) values, respectively termed  $L_0$  and  $L_a$ , are not created, the following default values are recommended:**

**For transmissive film:**  $L_0 = 2000 \text{ cd/m}^2$ ;  
 $L_a = 10 \text{ cd/m}^2$ ;

**For reflective media:**  $L_0 = 150 \text{ cd/m}^2$ ;

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**H.4.1.2.2 N-SET**

The N-SET may be used to update an instance of the Basic Film Session SOP Class.

**H.4.1.2.2.1 Attributes**

All Attributes and usage in Table H.4-2 apply to N-SET.

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**H.4.2 Basic Film Box SOP Class**

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**H.4.2.2.1 N-CREATE**

The N-CREATE is used to create an instance of the Basic Film Box SOP Class.

**H.4.2.2.1.1 Attributes**

The Attribute list of the N-CREATE is shown in Table H.4-6.

**Table H.4-6  
N-CREATE ATTRIBUTE LIST**

Attribute Name	Tag	Usage SCU/SCP
Image Display Format	(2010,0010)	M/M
...	...	...
Configuration Information	(2010,0150)	U/M
Referenced Presentation LUT Sequence	(2050,0500)	U/MC (Required if Presentation LUT is supported)
> <u>Referenced</u> SOP Class UID	(0008,1150)	U/MC (Required if sequence is present)
> <u>Referenced</u> SOP Instance UID	(0008,1155)	U/MC (Required if sequence is present)
Annotation Display Format ID	(2010,0030)	U/U
Smoothing Type	(2010,0080)	U/U
Border Density	(2010,0100)	U/U
Empty Image Density	(2010,0110)	U/U

Min Density	(2010,0120)	U/U
Trim	(2010,0140)	U/U
<b><u>Illumination</u></b>	<b><u>(2010,015E)</u></b>	<b><u>U/MC</u></b> <b><u>(Required if Presentation LUT is supported)</u></b>
<b><u>Reflective Reflected Ambient Light</u></b>	<b><u>(2010,0160)</u></b>	<b><u>U/MC</u></b> <b><u>(Required if Presentation LUT is supported)</u></b>
Requested Resolution ID	(2020,0050)	U/U

The meaning of the Usage SCU/SCP is described in Section H.2.4.

~~Values for Referenced Presentation LUT Sequence override any Presentation LUT that may have been set at the Basic Film Session.~~

**If the Illumination (2010,015E) and Reflected Ambient Light (2010,0160) values, respectively termed  $L_0$  and  $L_a$ , are not created, the following default values are recommended:**

**For transmissive film:  $L_0 = 2000 \text{ cd/m}^2$ .**

**$L_a = 10 \text{ cd/m}^2$ .**

**For reflective media:  $L_0 = 150 \text{ cd/m}^2$ .**

#### H.4.2.2.1.2 Status

The status values which are specific for this SOP Class are defined as follows:

Status	Meaning	Code
Success	Film Box successfully created	0000
Warning	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead.	B605
Failure	There is an existing Film Box that has not been printed and N-ACTION at the Film Session level is not supported. A new Film Box will not be created when a previous Film Box has not been printed.	C616

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#### H.4.2.2.2 N-SET

The N-SET may be used to update the last created instance of the Basic Film Box SOP Class.

##### H.4.2.2.2.1 Attributes

The Attributes which may be updated are shown in Table H.4-7.

**Table H.4-7  
N-SET ATTRIBUTES**

Attribute Name	Tag	Usage SCU/SCP
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Magnification Type	(2010,0060)	U/M
Max Density	(2010,0130)	U/M
Configuration Information	(2010,0150)	U/M
Referenced Presentation LUT Sequence	(2050,0500)	U/MC (Required if Presentation LUT is supported)
> <b>Referenced</b> SOP Class UID	(0008,1150)	U/MC (Required if sequence is present)
> <b>Referenced</b> SOP Instance UID	(0008,1155)	U/MC (Required if sequence is present)
Smoothing Type	(2010,0080)	U/U
Border Density	(2010,0100)	U/U
Empty Image Density	(2010,0110)	U/U
Min Density	(2010,0120)	U/U
<b>Illumination</b>	<b>(2010,015E)</b>	<b>U/MC</b> <b>(Required if Presentation LUT is supported)</b>
<del>Reflective-Reflected Ambient Light</del>	<del>(2010,0160)</del>	<del>U/MC</del> <del>(Required if Presentation LUT is supported)</del>
Trim	(2010,0140)	U/U

The meaning of the Usage SCU/SCP is described in Section H.2.4.

**Values for Referenced Presentation LUT Sequence override any Presentation LUT that may have been set at the Basic Film Session.**

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#### H.4.3.1.2.1.1 Attributes

The Attributes which may be updated are shown in Table H.4-10.

**Table H.4-10  
N-SET ATTRIBUTES**

Attribute Name	Tag	Usage SCU/SCP
Image Position	(2020,0010)	M/M
Basic Grayscale Image Sequence	(2020,0110)	M/M
>Samples Per Pixel	(0028,0002)	M/M
>Photometric Interpretation	(0028,0004)	M/M
>Rows	(0028,0010)	M/M
>Columns	(0028,0011)	M/M

>Pixel Aspect Ratio	(0028,0034)	MC/M (Required if the aspect ratio is not 1\1))
>Bits Allocated	(0028,0100)	M/M
>Bits Stored	(0028,0101)	M/M
>High Bit	(0028,0102)	M/M
>Pixel Representation	(0028,0103)	M/M
>Pixel Data	(7FE0,0010)	M/M
...		
Referenced Presentation LUT Sequence	(2050,0500)	U/U
> <b>Referenced</b> SOP Class UID	(0008,1150)	U/U
> <b>Referenced</b> SOP Instance UID	(0008,1155)	U/U
Original Image Sequence	(2130,00C0)	U/U
>Study Instance UID	(0020,000D)	MC/M (Required if Sequence is present)
>Series Instance UID	(0020,000E)	MC/M (Required if Sequence is present)
>Patient ID	(0010,0020)	MC/M (Required if Sequence is present and value is known)
>Referenced SOP Class UID	(0008,1150)	MC/M (Required if Sequence is present)
>Referenced SOP Instance UID	(0008,1155)	MC/M (Required if Sequence is present)
>Referenced Frame Number	(0008,1160)	MC/M (Required if Sequence is present and Original Image is a Multi-frame Image)
>Image Number	(0020,0013)	MC/M (Required if Sequence is present and value is known)

The meaning of the Usage SCU/SCP is described in Section H.2.4.

The values of Magnification Type (2010,0060) and Smoothing Type (2010,0080) of a particular image box override the values of Magnification Type and Smoothing Type of the film box.

Values for Referenced Presentation LUT Sequence override any Presentation LUT that may have been set at the ~~Basic Film Session or the~~ Basic Film Box. Values for Min/Max Density override any Density values that may have been set at the Basic Film Box.

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#### **H.4.9. Presentation LUT SOP Class**

##### **H.4.9.1 Information Object Description**

The Presentation LUT Information Object is an abstraction of a Presentation LUT (see Section H.2.1.1). The objective of the Presentation LUT is to realize image display tailored for specific modalities, applications, and user preferences. It is used to prepare image pixel data for display on devices that conform to the Grayscale Standard Display Function defined in PS 3.14.

Note: The density range to be printed, Min Density to Max Density, is specified at either the Film Box or the Image Box. As follows from the definition for Min Density and Max Density in PS 3.3, if the requested minimum density is lower than the minimum printer density, or the requested maximum density is greater than the maximum printer density, the printer will use its minimum or maximum density, respectively, when computing the standard response.

The output of the Presentation LUT is Presentation Values (P-Values). P-Values are approximately related to human perceptual response. They are intended to facilitate common input for both hardcopy and softcopy display devices. P-Values are intended to be independent of the specific class or characteristics of the display device.

The Presentation LUT is not intended to alter the appearance of the pixel values, as specified as specified by the Photometric Interpretation (0028,0004) and Polarity (2020,0020).

The ~~Basic Film Session Information Object~~, Basic Film Box Information Object, the Basic Image Box Information Object and the Referenced Image Box Object reference the Presentation LUT.

If the Configuration Information Attribute (2010,0150) of the Basic Film Box IOD contains information similar to the Presentation LUT, then the Presentation LUT Attributes shall take precedence.

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##### **H.4.9.2.1.3 Behavior**

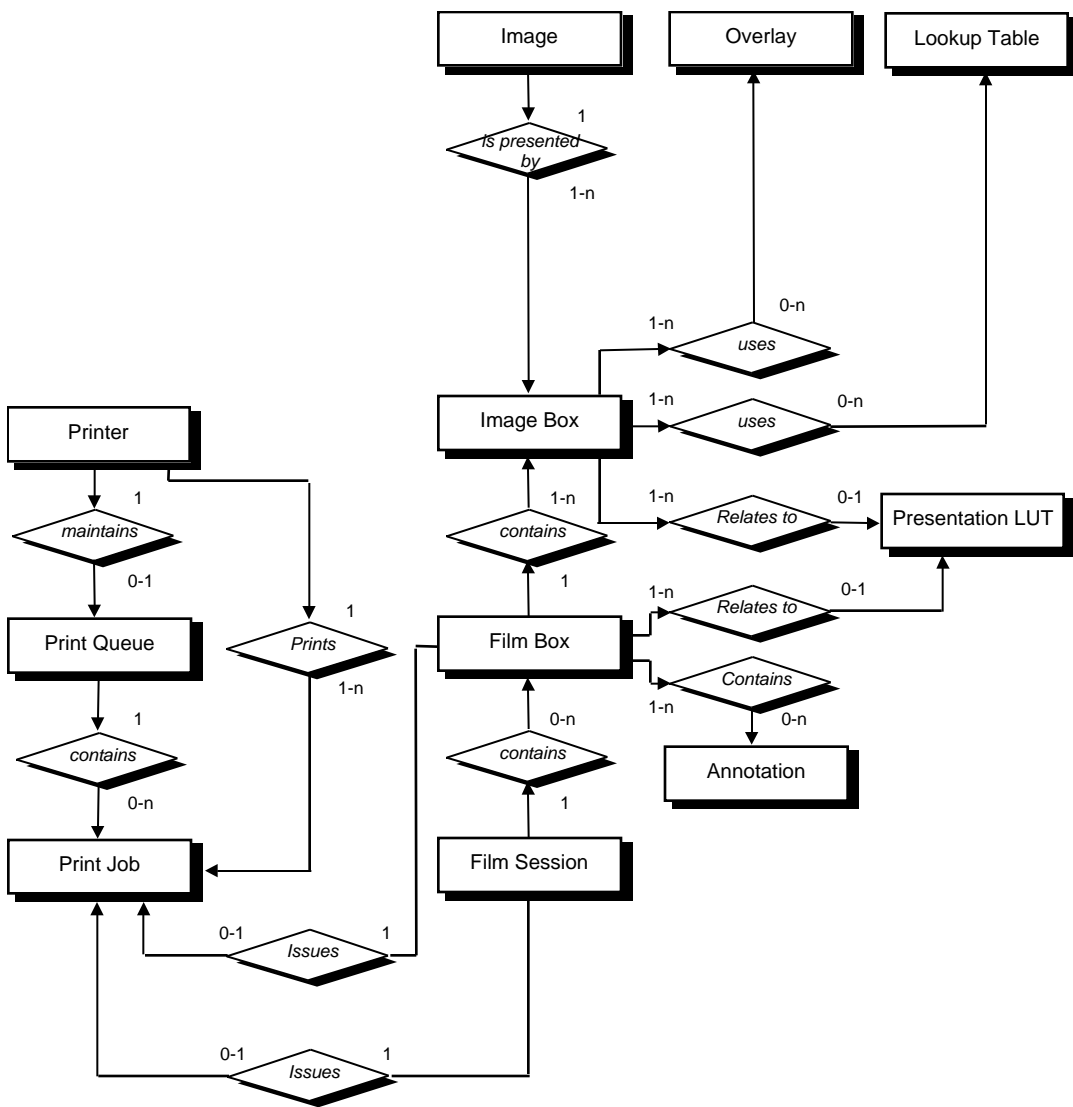
The SCU uses the N-CREATE Service Element to request the SCP to create a Presentation LUT SOP Instance. The SCU shall initialize Attributes of the SOP Class as specified in section H.2.4.

The SCU shall create the Presentation LUT prior to referencing from the ~~Film Session,~~ ~~the~~ Film Box or the Image Box.

The Presentation LUT persists in the SCP as long as the Association in which it was created is open or an explicit N-DELETE is issued by the SCU.

The SCP shall return the status code of the requested SOP Instance creation. The meaning of success, warning, and failure status codes is defined in Section H.2.5.

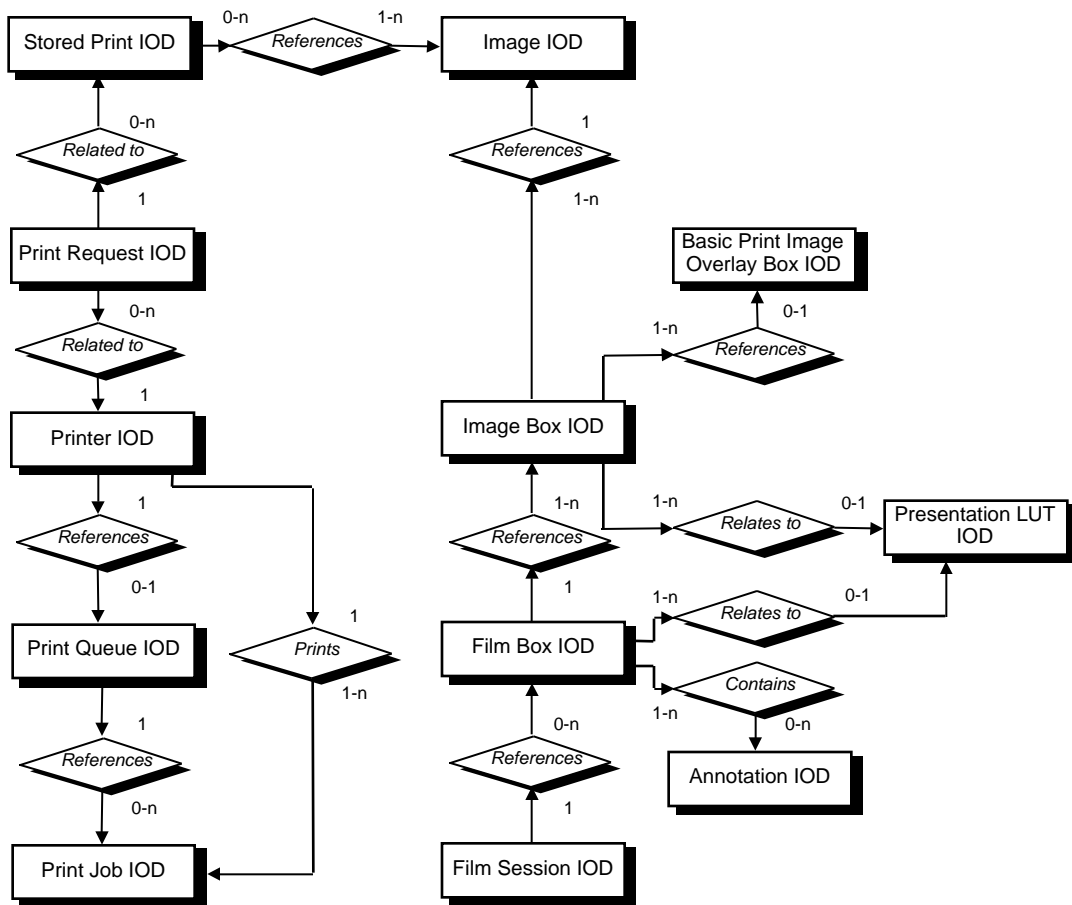
*Amend PS 3.3 Figure 7-1b to indicate Film Session no longer 'relates to' Presentation LUT directly:*





**Figure 7-1b**  
**DICOM MODEL OF THE REAL-WORLD - PRINT**

*Amend PS 3.3 Figure 7-2b to indicate Film Session no longer 'relates to' Presentation LUT directly:*



**Figure 7-2b**  
**DICOM INFORMATION MODEL - PRINT**

Amend PS 3.3-1998 Annex C as follows:

**C.13.2 Basic Film Session Relationship Module**

**Table C.13-2  
BASIC FILM SESSION RELATIONSHIP MODULE ATTRIBUTES**

<b>Attribute Name</b>	<b>Tag</b>	<b>Attribute Description</b>
Referenced Film Box Sequence	(2000,0500)	A Sequence which provides references to a set of Film Box SOP Class/Instance pairs. Zero or more Items may be included in this Sequence.
>Referenced SOP Class UID	(0008,1150)	Uniquely identifies the referenced SOP Class.
>Referenced SOP Instance UID	(0008,1155)	Uniquely identifies the referenced SOP Instance.
<del>Referenced Presentation LUT Sequence</del>	<del>(2050,0500)</del>	<del>A sequence that provides references to a Presentation LUT related SOP Class/Instance pairs. Only a single Item shall be included in this sequence.</del>
<del>&gt;Referenced SOP Class UID</del>	<del>(0008,1150)</del>	<del>Uniquely identifies the referenced SOP Class.</del>
<del>&gt;Referenced SOP Instance UID</del>	<del>(0008,1155)</del>	<del>Uniquely identifies the referenced SOP Instance.</del>
Proposed Study Sequence	(2130,00A0)	Attributes that may be used to identify Stored Print Storage and Hardcopy Image SOP Instances created to store this Film Session.