

1	Status	Draft Final Text
2	Date of Last Update	2025/01/08
3	Person Assigned	David Clunie
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5	Submitter Name	David Clunie
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7	Submission Date	2024/05/15

8	Correction Number CP-2414	
9	Log Summary: Clarify location of ICC Profile when Optical Path Sequence present	
10	Name of Standard	
11	PS3.3 2024e	
12	Rationale for Correction:	
13	In color whole slide microscopy images, the ICC profile is required to be present in each Item of the Optical Path Sequence, and	
14	even though the Image Pixel Module allows for an optional ICC profile in any image, it should be forbid for these images.	
15	Correction Wording:	

Amend DICOM PS3.3 as follows (changes to existing text are bold and underlined for additions and ~~struckthrough~~ for removals):

## A.32.2 VL Microscopic Image IOD

### A.32.2.3 VL Microscopic Image IOD Module Table

Table A.32.1-2. VL Microscopic Image IOD Modules

IE	Module	Reference	Usage
Image	General Image	???	M
	...		
	Optical Path	C.8.12.5	<b>U - Shall not be present if the ICC Profile Module is present.</b>
	Overlay Plane	???	U
	ICC Profile	C.11.15	<b>U - Shall not be present if the Optical Path Module is present.</b>
...			

## A.32.3 VL Slide-Coordinates Microscopic Image IOD

### A.32.3.3 VL Slide-Coordinates Microscopic Image IOD Module Table

Table A.32.1-3. VL Slide-Coordinates Microscopic Image IOD Modules

IE	Module	Reference	Usage
Image	General Image	???	M
	...		
	Optical Path	C.8.12.5	<b>U - Shall not be present if the ICC Profile Module is present.</b>
	Overlay Plane	???	U
	ICC Profile	C.11.15	<b>U - Shall not be present if the Optical Path Module is present.</b>
...			

## A.32.8 VL Whole Slide Microscopy Image IOD

### A.32.8.3 VL Whole Slide Microscopy Image IOD Module Table

Table A.32.8-1. VL Whole Slide Microscopy Image IOD Modules

IE	Module	Reference	Usage
Image	General Image	???	M
	...		
	Whole Slide Microscopy Image	???	M
	Optical Path	C.8.12.5	M
	Slide Label	???	C - Required if Image Type (0008,0008) Value 3 is LABEL; may be present otherwise
	SOP Common	???	M
...			

### C.7.6.3.3 Image Pixel Description Macro

Table C.7-11c. Image Pixel Description Macro Attributes

Attribute Name	Tag	Type	Attribute Description
...			
ICC Profile	(0028,2000)	3	<p>An ICC Profile encoding the transformation of device-dependent color stored pixel values into PCS-Values.</p> <p>See Section C.11.15.1.1.</p> <p>When present, defines the color space of color Pixel Data (7FE0,0010) values, and the output of Palette Color Lookup Table Data (0028,1201-1203).</p> <p><b><u>Shall not be present in the top level dataset when the Optical Path Sequence (0048,0105) is present.</u></b></p> <p><b>Note</b></p> <ol style="list-style-type: none"> <li>The profile applies only to Pixel Data (7FE0,0010) at the same level of the Data Set and not to any icons nested within Sequences, which may or may not have their own ICC profile specified.</li> <li><b><u>When the Optical Path Module is used, each optical path (Item of the Optical Path Sequence (0048,0105)) has its own ICC Profile (0028,2000).</u></b></li> </ol>
Color Space	(0028,2002)	3	<p>A label that identifies the well-known color space of the image. Shall be consistent with any ICC Profile (0028,2000) that is also present.</p> <p><b><u>Shall not be present when the Optical Path Sequence (0048,0105) is present.</u></b></p> <p>See Section C.11.15.1.2.</p>

### C.8.12.5 Optical Path Module

Table C.8.12.5-1 specifies the Attributes of the optical paths used in the VL imaging. Each optical path is a combination of illumination, filters, lenses, and sensors, and each combination is identified for possible reference by Attributes in other Modules. Additional optical path parameters may be specified in the Acquisition Context Module.

Table C.8.12.5-1. Optical Path Module Attributes

Attribute Name	Tag	Type	Attribute Description
...			
Optical Path Sequence	(0048,0105)	1	<p>Describes the optical paths used during the acquisition of this image.</p> <p>One or more Items shall be included in this Sequence.</p> <p>See Section C.8.12.5.1.1</p>
...			

Attribute Name	Tag	Type	Attribute Description
>ICC Profile	(0028,2000)	1C	An ICC Profile encoding the transformation of device-dependent stored pixel values into PCS-Values. See Section C.8.12.5.1.4  Required if Photometric Interpretation (0028,0004) is not MONOCHROME2, or if Palette Color Lookup Table Sequence (0048,0120) is present.  <b>Note</b>  <b><u>The ICC Profile (0028,2000) in the Image Pixel Description Macro is not used when the Optical Path Module is used.</u></b>
>Color Space	(0028,2002)	3	A label that identifies the well-known color space of the image. Shall be consistent with any ICC Profile (0028,2000) that is also present.  See Section C.11.15.1.2.

### C.8.12.5.1 Optical Path Module Attribute Descriptions

#### C.8.12.5.1.1 Optical Path Sequence and Optical Path Identifier

The Optical Path Sequence (0048,0105) shall include an Item for every optical path used in the acquisition of the current image.

...

#### C.8.12.5.1.4 ICC Profile

ICC Profile (0028,2000) provides the transform for mapping stored color pixel values into ICC standard color Profile Connection Space (PCS). For MONOCHROME2 pixels that have a preferred color rendering through the Palette Color Lookup Table Sequence (0048,0120), this Attribute provides a mapping of that preferred RGB color rendering into PCS. The ICC Profile shall follow the requirements specified in Section C.11.15.1.1.

### C.11.15 ICC Profile Module

**Table C.11.15-1. ICC Profile Module Attributes**

Attribute Name	Tag	Type	Attribute Description
ICC Profile	(0028,2000)	1	An ICC Profile encoding the transformation of device-dependent color stored pixel values into PCS-Values.
Color Space	(0028,2002)	3	A label that identifies the well-known color space of the image. Shall be consistent with any ICC Profile (0028,2000) that is also present.  See Section C.11.15.1.2.

#### C.11.15.1 ICC Profile Module Attribute Descriptions

##### C.11.15.1.1 ICC Profile

ICC Profile (0028,2000) encodes an ICC Input Device Profile that encodes the transformation of device-dependent color stored pixel values into PCS-Values.

...

##### C.11.15.1.2 Color Space

The Color Space Attribute provides a label that identifies the color space by name, when the ICC Profile (0028, 2000) (if present) describes a well-known color space.

## Defined Terms:

- SRGB** ICC Profile (0028,2000) defines sRGB color space [IEC 61966-2.1]
- ADOBERGB** ICC Profile (0028,2000) defines Adobe RGB color space [Adobe RGB]
- ROMMRGB** ICC Profile (0028,2000) defines ROMM RGB color space [ISO 22028-2]

*For reference unchanged, hyperlink targets:*

## 2 Normative References

The following standards contain provisions that, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibilities of applying the most recent editions of the standards indicated below.

### 2.1 International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC)

[ISO 22028-2] ISO. 2013. *Photography and graphic technology - Extended colour encodings for digital image storage, manipulation and interchange - Part 2: Reference output medium metric RGB colour image encoding (ROMM RGB)*. [http://www.iso.org/iso/catalogue\\_detail.htm?csnumber=56591](http://www.iso.org/iso/catalogue_detail.htm?csnumber=56591) .

[IEC 61966-2.1] IEC. 1999. Ed 1.0. *Multimedia systems and equipment - colour measurement and management - Part 2.1: colour management - Default RGB colour space - sRGB*.

### 2.6 Other References

[Adobe RGB] Adobe Systems Incorporated. 1998. 2005-05. *Adobe RGB (1998) Color Image Encoding*. <http://www.adobe.com/digitalimag/pdfs/AdobeRGB1998.pdf> .

## C.7.6.14 Acquisition Context Module