

DICOM Correction Item

Correction Number	CP-236
Log Summary: Pixel Data Excess Padding	
Type of Modification	Name of Standard
Clarification	PS 3.3-2000
Rationale for Correction <p>There is an issue with images that have more bytes in the Pixel Data than are required based on rows x columns x frames x bitsallocated / 8. This occurs in products from at least two vendors. These images are being rejected by validation routines in some C-STORE SCPs, again from at least two vendors.</p> <p>There is no explicit rule in DICOM either to forbid or to permit this excess padding in the Pixel Data. Part 5, section 8.1.1 has only:</p> <p style="padding-left: 40px;">... Also, the Value Field containing Pixel Data, like all other Value Fields in DICOM, shall be an even number of bytes in length. This means that the Value Field may need to be padded with data that is not part of the image and shall not be considered significant. If needed, the padding bits shall be appended to the end of the Value Field.</p> <p>It does not specifically restrict padding to fill out to the next even byte boundary and not beyond. On the other hand, it speaks of the "need" to pad to an even number of bytes, from which it might be inferred that if there is no need to pad, there should be no padding.</p> <p>There is a major concern that this excess padding may be used to convey private data, bypassing the data coding rules of DICOM and the semantics of the Pixel Data element.</p> <p>This CP seeks to clarify the issue by forbidding excess padding in future implementations. There will be an impact to implementations no matter which way the issue is resolved.</p> <p>Note that the implementation of digital signatures in accordance with Supplement 41 will require applications to be bit-preserving, including preserving data element padding. It is critical to forbid excess Pixel Data padding prior to the adoption of digital signatures.</p>	
Sections of documents affected <p>PS 3.5, Section C.8.1.1.</p>	

Correction Wording:

PS 3.5

8.1.1 Pixel data encoding ~~of~~ and related data elements

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~~Starting with DICOM Version 3.0,~~ Restrictions are placed on acceptable Values for Bits Allocated (0028,0100), Bits Stored (0028,0101), and High Bit (0028,0102) and are specified in the Information Object Definitions in PS3.3. Also, the Value Field containing Pixel Data, like all other Value Fields in DICOM, shall be an even number of bytes in length. This means that the Value Field may need to be padded with data that is not part of the image and shall not be considered significant. If needed, the padding bits shall be appended to the end of the Value Field, **and shall be used only to extend the data to the next even byte increment of length.**

In a multi-frame object that is transmitted in Native Format, the individual frames are not padded. The individual frames shall be concatenated and padding bits (if necessary) apply to the complete Value Field.

Note: Receiving applications should be aware that some older applications may send Pixel Data with excess padding, which was not explicitly prohibited in earlier versions of the Standard. Applications should be prepared to accept such Pixel Data data elements, but may delete the excess padding. In no case should a sending application place private data in the padding data.