

DICOM Conformance Statement

Application Annex:
2D Perfusion R1.1.5



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1. Introduction

This DICOM Conformance Statement annex is applicable to 2D Perfusion R1.1.5 Application, later referred to as 2D Perfusion Application. In general the 2D Perfusion Application is the user environment for viewing and analyzing XA and SC images. 2D Perfusion imaging is designed to give clinicians deeper insight into tissue perfusion during endovascular, neurology, and oncology interventions. It can assist while trying to restore vessel patency, to overcome ischemia and compromised organ function, or while embolizing tumors. It helps clinicians to identify the severity of a patient's condition before the intervention and verify the effect and completeness of treatment immediately afterwards.

1.1. Revision History

The revision history below provides dates and differences among individual document versions.

Table 1: Revision History

Document Version	Date of Issue	Status	Description
00	26-February-2015	Final	

1.2. Terminology

DICOM	Digital Imaging and Communications in Medicine
IOD	Information Object Definition
UID	Unique Identifier
VR	Value Representation

2. Data Specifications

2.1. Supported IOD's

This section specifies each IOD accepted and / or created by 2D Perfusion Application.

ACCEPTED The applicable IOD is accepted for storage in the repository of the hosting platform and supported for import 2D Perfusion Application or viewing and analysis.

CREATED The 2D Perfusion Application supports generation of derived data by using the applicable IOD and is able to store this data in the repository of the hosting platform.

Table 2: Supported IOD's

Name	IOD		Support	
	UID		ACCEPTED	CREATED
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1		Yes	No
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7		Yes	Yes
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66		Yes	Yes

2.1.1. Acceptance Criteria

This section specifies the acceptance criteria applied by 2D Perfusion Application to which a dataset should adhere before it can be imported into the application. This can be criteria on the highest level (e.g. data from a certain manufacturer or system model) or certain DICOM attributes mandatory to be present into the dataset holding a specific value. In case one or more Philips private attributes are required, then a list of supported Philips system models will be mentioned.

Table 3: Accepted system models.

Manufacturer	Modality	System Model Name(s)
Not applicable	Not applicable	Not applicable

Table 4: Accepted transfer syntaxes per IOD

Name	IOD		Transfer Syntax	
	UID		Name	UID
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1		Implicit VR Little Endian	1.2.840.10008.1.2
			Explicit VR Big Endian	1.2.840.10008.1.2.2
			Explicit VR Little Endian	1.2.840.10008.1.2.1
			JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91
			JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90
			JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
			JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51
			JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70
			RLE Lossless	1.2.840.10008.1.2.5
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7		Implicit VR Little Endian	1.2.840.10008.1.2
			Explicit VR Big Endian	1.2.840.10008.1.2.2
			Explicit VR Little Endian	1.2.840.10008.1.2.1
			JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91
			JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90
			JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
			JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51
			JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70

		RLE Lossless	1.2.840.10008.1.2.5
		Implicit VR Little Endian	1.2.840.10008.1.2
		Explicit VR Big Endian	1.2.840.10008.1.2.2
		Explicit VR Little Endian	1.2.840.10008.1.2.1
		JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70
		RLE Lossless	1.2.840.10008.1.2.5

Table 5: Accepted attribute values

Attribute Name	Attribute Number	Values / Comments
Not applicable	Not applicable	Not applicable

2.1.2. Contents of Created IOD's

This section specifies in detail the attribute contents of created data objects. Attributes are grouped together by its corresponding module as specified by DICOM standard. Philips private attributes are excluded for specification.

Abbreviations used in the Module table for the column "Presence of Value" are:

ALWAYS	The attribute is always present with a value
EMPTY	The attribute is always present without any value (attribute sent zero length)
VNAP	The attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present)
ANAP	The attribute is present under specified condition – if present then it will always have a value

The abbreviations used in the Module table for the column "Source" are:

AUTO	The attribute value is generated automatically
CONFIG	The attribute value source is a configurable parameter
COPY	The attribute value source is another SOP instance
FIXED	The attribute value is hard-coded in the application
IMPLICIT	The attribute value source is a user-implicit setting
MPPS	The attribute value is the same as that use for Modality Performed Procedure Step
MWL	The attribute value source is a Modality Worklist
USER	The attribute value source is explicit user input

2.1.2.1. Secondary Capture Image Storage SOP class

Table 6: IOD of Created Secondary Capture Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	CONDITIONAL
	SC Equipment Module	ALWAYS
Image	General Image Module	ALWAYS

	Image Pixel Module	ALWAYS
	SOP Common Module	ALWAYS
	Extended DICOM and private attributes	CONDITIONAL

Table 7: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	AUTO	
Patient ID	0010,0020	LO		ALWAYS	AUTO	
Patient's Birth Date	0010,0030	DA		ALWAYS	AUTO	
Patient's Sex	0010,0040	CS		ALWAYS	AUTO	

Table 8: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	AUTO	
Study Time	0008,0030	TM		ALWAYS	AUTO	
Accession Number	0008,0050	SH				
Referring Physician's Name	0008,0090	PN		VNAP	AUTO	
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	
Study ID	0020,0010	SH		ALWAYS	AUTO	

Table 9: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	
Series Time	0008,0031	TM		ALWAYS	AUTO	
Modality	0008,0060	CS		ALWAYS	AUTO	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS			AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	
Performed Procedure Step ID	0040,0253	SH		ALWAYS	AUTO	
Performed Procedure Step Description	0040,0254	LO		VNAP	AUTO	
Related Series Sequence	0008,1250	SQ		VNAP		
>Study Instance UID	0020,000D	UI		ALWAYS		
>Series Instance UID	0020,000E	UI		ALWAYS		
>Purpose of Reference Code Sequence	0040,A170	SQ		EMPTY		

Table 10: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Institution Name	0008,0080	LO		VNAP	AUTO	
Station Name	0008,1010	SH		ANAP		
Manufacturer's Model Name	0008,1090	LO	Interventional Workspot	ALWAYS	FIXED	
Software Version(s)	0018,1020	LO	1.3.0	ALWAYS	FIXED	

Table 11 : SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ANAP		

Conversion Type	0008,0064	CS	WSD	ALWAYS		
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Table 12: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS				

Table 13: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS		
Photometric Interpretation	0028,0004	CS		ALWAYS		
Planar Configuration	0028,0006	US		ANAP		
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Bits Allocated	0028,0100	US	8	ALWAYS		
Bits Stored	0028,0101	US	8	ALWAYS		
High Bit	0028,0102	US	7	ALWAYS		
Pixel Representation	0028,0103	US	0000	ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	

Table 14: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	CONDITIONAL	FIXED	
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.7	ALWAYS	FIXED	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Instance Creation Date	0008,0012	DA		VNAP	AUTO	
Instance Creation Time	0008,0013	TM		VNAP	AUTO	
Instance Number	0020,0013	IS		ANAP	AUTO	

Table 15 : Extended DICOM and private attributes for Secondary Capture Image Storage SOP Class Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Private	2001,0010	LO		ANAP		
Private	2001,0011	LO		ANAP		
Private	2001,10c1	LO		ANAP		
Medical Alerts	0010,2000	LO		ANAP		
Allergies	0010,2110	LO		ANAP		
Pregnancy Status	0010,21C0	US		ANAP		
Requested Procedure Description	0032,1060	LO		ANAP		
Requested Contrast Agent	0032,1070	LO		ANAP		
Special Needs	0038,0050	LO		ANAP		
Patient State	0038,0500	LO		ANAP		
Private	2001,0010	LO		ANAP		
Private	2001,1063	CS		ANAP		
Private	2003,0020	LO		ANAP		
Private	2003,20C3	DT		ANAP		

2.1.2.2. Raw data Storage SOP class

Table 16: IOD of Created Raw Data Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	General Series Module	ALWAYS
Frame of Reference	Frame of Reference	OPTIONAL
Equipment	General Equipment Module	ALWAYS
Image	Acquisition Context Module	ALWAYS
	Raw Data Module	ALWAYS
	SOP Common Module	ALWAYS

Table 17 : Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	AUTO	
Patient ID	0010,0020	LO		ALWAYS	AUTO	
Patient's Birth Date	0010,0030	DA		VNAP	AUTO	
Patient's Sex	0010,0040	CS		ALWAYS	AUTO	

Table 18 : General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	AUTO	
Study Time	0008,0030	TM		ALWAYS	AUTO	
Referring Physician's Name	0008,0090	PN		VNAP	AUTO	
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	
Study ID	0020,0010	SH		ALWAYS	AUTO	
Accession Number	0008,0050	SH		EMPTY	AUTO, USER	

Table 19 : General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	
Series Time	0008,0031	TM		ALWAYS	AUTO	
Modality	0008,0060	CS		ALWAYS	AUTO	
Performing Physicians' name	0008,1050	PN				
Related Series Sequence	0008,1250	SQ				
>Study Instance UID	0020,000D	UI				
>Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
>Purpose of Reference Code Sequence	0040,A170	SQ				
Series Number	0020,0011	IS		ALWAYS	AUTO	
Laterality	0020,0060	CS		ANAPCV		

Table 20: Frame of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame of Reference UID	0020,0052	UI		ALWAYS	AUTO	
Position Reference Indicator	0020,1040	LO		VNAP	AUTO	

Table 21: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	FIXED	
Institution Name	0008,0080	LO		ANAP	USER	
Station Name	0008,1010	SH		ANAP		
Manufacturer's Model Name	0008,1090	LO	Interventional Workspot	ANAP	FIXED	
Device Serial Number	0018,1000	LO		ANAP	AUTO	
Software Version(s)	0018,1020	LO	1.3.0	ANAP	AUTO	

Table 22: Acquisition Context Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Context Sequence	0040,0555	SQ		VNAP	AUTO	

Table 23: Raw Data Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Date	0008,0023	DA		ALWAYS	AUTO	
Content Time	0008,0033	TM		ALWAYS	AUTO	
Creator Version UID	0008,9123	UI		ALWAYS	AUTO	
Instance Number	0020,0013	IS		ANAP	AUTO	

Table 24: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.66	ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Original Specialized SOP Class UID	0008,001B	UI		VNAP	AUTO	
Instance Creation Date	0008,0012	DA		VNAP	AUTO	
Instance Creation Time	0008,0013	TM		VNAP	AUTO	
Instance Number	0020,0013	IS		VNAP		

Table 25: Extended DICOM and private attributes for Raw Data Image Storage SOP class

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Date	0040,A121	DA		VNAP	AUTO	
Time	0040,A122	TM		VNAP	AUTO	
Private	2001,0011	LO		VNAP		
Private	2001,115F	SQ		VNAP		
>Laterality	0020,0060	CS		VNAP		
>Position Reference Indicator	0020,1040	LO		VNAP		
>Acquisition Context Sequence	0040,0555	SQ		VNAP		
>Institution Name	0008,0080	LO		VNAP		
>Referring Physician's Name	0008,0090	PN		VNAP		
>Patient's Birth Date	0010,0030	DA		VNAP		
>Patient's Sex	0010,0040	CS		VNAP		
>Device Serial Number	0018,1000	LO		VNAP		
>Distance Source to Detector	0018,1110	DS		VNAP		
>Requested Procedure ID	0040,1001	SH		VNAP		
>Private	2001,0010	LO		VNAP		
>Private	2001,1063	CS		VNAP		

>Private	2003,0020	LO		VNAP		
>Private	2003,2043	UL		VNAP		
>Private	2003,2044	LO		VNAP		
>Private	2003,2047	LO		VNAP		
>Private	2003,2084	SQ		VNAP		
>>Private	2003,0020	LO		VNAP		
>>Private	2003,2047	LO		VNAP		
>>Private	2003,2085	FD		VNAP		
>>Private	2003,2086	FD		VNAP		
>>Private	2003,2087	FD		VNAP		
>>Private	2003,2088	UI		VNAP		
>>Private	2003,2089	LO		VNAP		
>>Private	2003,208A	IS		VNAP		
>>Private	2003,208B	DS		VNAP		
>>Private	2003,208C	DS		VNAP		