

**Appendix 2: Mapping Z39.87 to TIFF 6.0, DIG35 v1.1 and EXIF 2.2**

NISO Z39.87				NISO Z39.87 Required	TIFF 6.0 / TIFF EP Tag #	DIG35 v1.1	EXIF 2.2
<b>6 Basic image parameters</b>	6.1 Format	6.1.1 MIMEType		R	37398	A.3.1.1 (File and Format: MIME Type)	N/A
		6.1.2 ByteOrder		R	N/A	N/A	N/A
	6.1.3 Compression	6.1.3.1 CompressionScheme		M	259	A.3.1.4 (Compression Method)	259 (Compression)
		6.1.3.2 CompressionLevel		MA	N/A	N/A	37122 (Image compression mode, CompressedBitsPerPixel)
	6.1.4 PhotometricInterpretation	6.1.4.1 ColorSpace		M	262	A.3.3.1 (Colorspace)	262 (Pixel Composition/ Photometric Interpretation) & 40961 (Color Space)
		6.1.4.2 ICCProfile	6.1.4.2.1 ProfileName	MA		A.3.3.1 (Colorspace: Profile Name)	
			6.1.4.2.2 ProfileURL	MA	N/A	A.3.3.1 (Colorspace: Profile Reference)	N/A
		6.1.4.3 YCbCrSubSampling		MA	530	A.3.4 (Component Information: Component Description and Sampling Ratio)	530
		6.1.4.4 YCbCrPositioning		MA	531	A.3.4 (Component Information: Pixel Composition)	531
		6.1.4.5 YCbCrCoefficients		MA	529	N/A	529
		6.1.4.6 ReferenceBlackWhite		MA	532	N/A	532
	6.1.5 Segments	6.1.5.1 SegmentType		M	N/A	N/A	N/A
		6.1.5.2 StripOffsets		R	273	N/A	273
		6.1.5.3 RowsPerStrip		R	278	N/A	278
		6.1.5.4 StripByteCounts		R	279	N/A	279
		6.1.5.5 TileWidth		R	322	N/A	N/A
		6.1.5.6 TileLength		R	323	N/A	N/A
		6.1.5.7 TileOffsets		R	324	N/A	N/A
		6.1.5.8 TileByteCounts		R	325	N/A	N/A
	6.1.6 PlanarConfiguration			MA	284	N/A	284
	6.2 File	6.2.1 ImageIdentifier		M	N/A	A.3.1.2 (Image Identifier: Unique Identifier)	42016 (UniqueImageID)
		6.2.1.1 ImageIdentifierLocation		O	N/A		
		6.2.2 FileSize		M	N/A	N/A	N/A

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	6.2.3 Checksum	6.2.3.1 ChecksumMethod	R	N/A	N/A	N/A	
		6.2.3.2 ChecksumValue	R	N/A	N/A	N/A	
	6.2.4 Orientation		R	274	N/A	274	
	6.2.5 DisplayOrientation		O	N/A	N/A	N/A	
	6.2.6 TargetedDisplayAR	6.2.6.1 XTargetedDisplayAR	O	N/A	N/A	N/A	
		6.2.6.2 YTargetedDisplayAR	O	N/A	N/A	N/A	
	6.3 PreferredPresentation		O	N/A	N/A	N/A	
7 Image creation	7.1 SourceType		R		B.3.1 (General Creation Information: Image Source, Scene Type) and B.3.5 (Captured Item)	For digital camera capture, this info is found in 41728 (FileSource) and 41729 (SceneType)	
	7.2 SourceID		O	N/A	N/A	N/A	
	7.3 ImageProducer		R	315 (Artist)	B.3.1 (Operator Organization, Operator ID)	315 (Artist)	
	7.4 HostComputer		R	316	B.3.2.2 Software Information (Camera Capture) and B.3.3.2 (Scanner Capture)	N/A	
		7.4.1 OS (Operating System)		R	N/A	N/A	
		7.4.2 OSVersion		MA	N/A	N/A	
	7.5 DeviceSource		R	N/A	B.3.1 (Image Source)	N/A	
	7.6 ScanningSystemCapture	7.6.1 ScanningSystemHardware	7.6.1.1 ScannerManufacturer	R	271 (Make)	B.3.3.1 (Scanner Information: Manufacturer Name)	N/A
			7.6.1.2 ScannerModel	R	272 (Model)	B.3.3.1 (Scanner Information: Model)	N/A
			7.6.1.2.1 ScannerModelName	R	N/A	N/A	N/A
			7.6.1.2.2 ScannerModelNumber	R	N/A	N/A	N/A
			7.6.1.2.3 ScannerModelSerialNo	O	N/A	B.3.3.1 (Scanner Information: Serial)	N/A
		7.6.2 ScanningSystemSoftware	7.6.2.1 ScanningSoftware	R	305	B.3.3.2 Software Information	305
			7.6.2.2 ScanningSoftwareVersionNo	R	N/A	B.3.3.2 Software Information: Version	N/A
	7.6.3 ScannerCaptureSettings	7.6.3.1 PixelSize	O	N/A	B.3.3.3 (Scanner Capture Settings: Pixel Size)	N/A	

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NISO Z39.87	NISO Z39.87 Required	TIFF 6.0 / TIFF EP Tag #	DIG35 v1.1	EXIF 2.2
7.6.3.2 PhysScanResolution	O	N/A	B.3.3.3 (Scanner Capture Settings: Physical Scan Resolution: Width)	N/A
7.6.3.2.1 XphysScanResolution	O	N/A	B.3.3.3 (Scanner Capture Settings: Physical Scan Resolution: Height)	N/A
7.6.3.2.2 YphysScanResolution	O	N/A	B.3.2.1 (Camera Information: Manufacturer)	271 (Make)
7.7 DigitalCameraCapture	R	271 (Make)	B.3.2.1 (Camera Information: Model)	272 (Model)
7.7.1 DigitalCameraManufacturer	R	272 (Model)	B.3.2.5 (Camera Capture Settings: F-Number)	33437 (Fnumber)
7.7.2 DigitalCameraModel	O	N/A	B.3.2.5 (Camera Capture Settings: Exposure Time)	33434
7.7.3 CameraCaptureSettings	O	N/A	B.3.2.5 (Camera Capture Settings: Brightness)	37379 (BrightnessValue)
7.7.3.1 FNumber	O	N/A	B.3.2.5 (Camera Capture Settings: Exposure Bias Value)	37380 (ExposureBiasValue)
7.7.3.2 ExposureTime	O	N/A	B.3.2.5 (Camera Capture Settings: Subject Distance)	37382
7.7.3.3 Brightness	O	N/A	B.3.2.5 (Camera Capture Settings: Metering Mode)	37383
7.7.3.4 ExposureBias	O	N/A	B.3.2.5 (Camera Capture Settings: Scene Illuminant)	37384 (LightSource)
7.7.3.5 SubjectDistance	O	N/A	B.3.2.5 (Camera Capture Settings: Color Temperature)	N/A
7.7.3.6 MeteringMode	O	N/A	B.3.2.5 (Camera Capture Settings: Focal Length)	37386
7.7.3.7 Scenelluminant	O	N/A	B.3.2.5 (Camera Capture Settings: Flash)	37385
7.7.3.8 ColorTemp	O	N/A	B.3.2.5 (Camera Capture Settings: Flash Energy)	41483
7.7.3.9 FocalLength	O	N/A	B.3.2.5 (Camera Capture Settings: Flash Return)	Within 37385 (Flash)
7.7.3.10 Flash	O	N/A	B.3.2.5 (Camera Capture Settings: Back Light)	N/A
7.7.3.11 FlashEnergy	O	N/A		
7.7.3.12 FlashReturn	O	N/A		
7.7.3.13 BackLight	O	N/A		

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NISO Z39.87			NISO Z39.87 Required	TIFF 6.0 / TIFF EP Tag #	DIG35 v1.1	EXIF 2.2
		7.7.3.14 ExposureIndex	O	N/A	B.3.2.5 (Camera Capture Settings: Exposure Index)	41493
		7.7.3.15 AutoFocus	O	N/A	B.3.2.5 (Camera Capture Settings: Auto Focus)	N/A
		7.7.3.16 PrintAspectRatio	O	N/A	B.3.2.5 (Camera Capture Settings: Print Aspect Ratio)	N/A
			O	N/A	B.3.2.5 (Camera Capture Settings: Print Aspect Ratio)	N/A
	7.8 Sensor		R	37399	B.3.2.4 (Sensor Technology)	41495 (SensingMethod)
	7.9 DateTimeCreated		MA	306 (DateTime)	B.3.1 (General Creation Information: Creation Date and Time), also C.3 (Capture Time and Date)	36867 (DateTimeOriginal) & 36868 (DateTimeDigitized)
	7.10 Methodology		O	N/A	Could be stored in C.3.12 (Content Description: Comment)	N/A
<b>8 Imaging performance assessment</b>	8.1 Spatial metrics	8.1.1 SamplingFrequencyPlane	M	N/A	B.3.2.4 (Device Characterization: Spatial Frequency Response)	41484 (SpatialFrequencyResponse)
		8.1.2 SamplingFrequencyUnit	M	296 (Resolution Unit)	N/A	41488 (FocalPlaneResolutionUnit)
		8.1.3 XSamplingFrequency	MA	282	B.3.2.4 (Device Characterization: Focal Plane Resolution)	41486 (FocalPlaneXResolution)
		8.1.4 YSamplingFrequency	MA	283	"	41487 (FocalPlaneYResolution)
		8.1.5 ImageWidth	MA	256	A.3.1.3 (Image Size)	256 / 40962 (PixelXDimension for compressed images)
		8.1.6 ImageLength	MA	257	A.3.1.3 (Image Size)	257 / 40963 (PixelYDimension for compressed images)

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NISO Z39.87		NISO Z39.87 Required	TIFF 6.0 / TIFF EP Tag #	DIG35 v1.1	EXIF 2.2
	8.1.7 Source_Xdimension	O	N/A	B.3.5.1 (Captured Item: Reflection Print: Document Size) and 3.5.2 (Captured Item: Film: Film Size)	N/A
	8.1.7.1 Source_XdimensionUnit	O	N/A	N/A (values always recorded in meters)	N/A
	8.1.8 Source_Ydimension	O	N/A	B.3.5.1 (Captured Item: Reflection Print: Document Size) and 3.5.2 (Captured Item: Film: Film Size)	N/A
	8.1.8.1 Source_YdimensionUnit	O	N/A	N/A (values always recorded in meters)	N/A
8.2 Energetics	8.2.1 BitsPerSample	M	258	N/A	258
	8.2.2 SamplesPerPixel	M	277	N/A	277
	8.2.3 ExtraSamples	MA	338	N/A	N/A
	8.2.4 Colormap	MA	N/A	Variant: Color Filter Array (B.3.2.4 Device Characterization: CFA Pattern)	
	8.2.4.1 Colormap_Reference	MA	320 (ColorMap)	"	N/A
	8.2.4.2 Colormap_BitCodeValue	MA	320 (ColorMap)	"	N/A
	8.2.4.3 Colormap_RedValue	MA	320 (ColorMap)	"	N/A
	8.2.4.4 Colormap_GreenValue	MA	320 (ColorMap)	"	N/A
	8.2.4.5 Colormap_BlueValue	MA	320 (ColorMap)	"	N/A
	8.2.5 GrayResponseCurve	R	291	N/A	N/A
	8.2.6 GrayResponseUnit	R	290	N/A	N/A
	8.2.7 WhitePoint	O	318	N/A	318
	8.2.7.1 WhitePoint_Xvalue	O	318	N/A	318
	8.2.7.2 WhitePoint_Yvalue	O	318	N/A	318
	8.2.8 PrimaryChromaticities	O	319	N/A	319
	8.2.8.1 PrimaryChromaticities_RedX	O	319	N/A	319
	8.2.8.2 PrimaryChromaticities_RedY	O	319	N/A	319
	8.2.8.3 PrimaryChromaticities_GreenX	O	319	N/A	319
	8.2.8.4 PrimaryChromaticities_GreenY	O	319	N/A	319
	8.2.8.5 PrimaryChromaticities_BlueX	O	319	N/A	319
	8.2.8.6 PrimaryChromaticities_BlueY	O	319	N/A	319
8.3 TargetData	8.3.1 TargetType	R	N/A	N/A	N/A
	8.3.2 TargetID	R	N/A	N/A	N/A
	8.3.2.1 TargetIDManufacturer	R	N/A	N/A	N/A
	8.3.2.2 TargetIDName	R	N/A	N/A	N/A

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		8.3.2.3 TargetIDNo	R	N/A	N/A	N/A
		8.3.2.4 TargetIDMedia	MA	N/A	N/A	N/A
		8.3.3 ImageData	R	N/A	N/A	N/A
		8.3.4 PerformanceData	O	N/A	N/A	N/A
		8.3.5 Profiles	O	N/A	N/A	N/A
<b>9 Change history</b>	9.1 Image processing	9.1.1 DateTimeProcessed	MA	306 (DateTime - changed)	dig35:TIMESTAMP	306 (DateTime - changed)
		9.1.2 SourceData	MA	N/A	History Metadata embedded with original data. Not repeated.	N/A
		9.1.3 ProcessingAgency	R	N/A	N/A	N/A
		9.1.4 ProcessingSoftware	R	N/A	D.3.2 (Image Processing Hints)	N/A
		9.1.4.1 ProcessingSoftwareName	R	N/A	D.3.2 (Image Processing Hints)	N/A
		9.1.4.2 ProcessingSoftwareVersion	R	N/A	D.3.1 (Processing History)	N/A
		9.1.5 ProcessingActions	R	N/A	D.3.1 (Processing History)	N/A
	9.2 Previous image metadata		[retains type]	TIFF/EP 37395 (Image History)	D.3.3 Previous History Metadata	N/A
<b>Number of Tags</b>	112					