
**Image technology colour
management — Extensions to
architecture, profile format and data
structure**

*Gestion des couleurs dans les technologies de l'image — Extensions
d'architecture, de format de profil et de structure de données*

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

ISO 20677:2019

<https://standards.iteh.ai/catalog/standards/iso/54278abb-779b-47a9-a2eb-20829f36b1dd/iso-20677-2019>



iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

ISO 20677:2019

<https://standards.iteh.ai/catalog/standards/iso/54278abb-779b-47a9-a2eb-20829f36b1dd/iso-20677-2019>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	ix
Introduction	x
1 Scope	1
2 Normative references	1
3 Terms, definitions and abbreviated terms	1
3.1 Terms and definitions	1
3.2 Abbreviated terms	2
4 Extended basic types	3
4.1 General	3
4.2 Extended basic type listing	3
4.2.1 azimuthNumber	3
4.2.2 float16Number	3
4.2.3 float64Number	4
4.2.4 horizontalNumber	4
4.2.5 Sparse matrix encodings	4
4.2.6 sparseMatrixEncodingType	6
4.2.7 spectralRange	7
4.2.8 tintArray	7
4.2.9 valueEncodingType	7
4.2.10 verticalNumber	8
4.2.11 zenithNumber	8
5 Conformance	9
6 Expanded PCSs, rendering intents and device encoding	9
6.1 General considerations	9
6.2 Extensions to device colour encoding	9
6.3 Extensions to PCSs	10
6.3.1 General	10
6.3.2 Profile connection conditions	10
6.3.3 Spectral PCSs	11
6.3.4 BRDF connection	13
6.3.5 Directional viewing connection	13
6.4 Multiplex connection spaces	13
6.4.1 General	13
6.4.2 MCS signature encoding	14
6.5 Colour encoding space profiles	14
7 Profile requirements	15
7.1 General	15
7.2 Profile header	17
7.2.1 General	17
7.2.2 Extended profile header field definitions	17
7.2.3 ColourEncodingSpace class profile header field definitions	18
7.2.4 Profile size field (bytes 0 to 3)	18
7.2.5 Preferred CMM type field (bytes 4 to 7)	18
7.2.6 Profile version and sub-version field (bytes 8 to 11)	18
7.2.7 Profile/device class field (bytes 12 to 15)	19
7.2.8 Data colour space field (Bytes 16 to 20)	19
7.2.9 PCS field (Bytes 20 to 23)	20
7.2.10 Date and time field (bytes 24 to 35)	21
7.2.11 Profile file signature field (bytes 36 to 39)	21
7.2.12 Primary platform field (bytes 40 to 43)	21
7.2.13 Profile flags field (bytes 44 to 47)	21
7.2.14 Device manufacturer field (bytes 48 to 51)	22

7.2.15	Device model field (bytes 52 to 55)	22
7.2.16	Device attributes field (bytes 56 to 63)	22
7.2.17	Rendering intent field (bytes 64 to 67)	23
7.2.18	PCS illuminant field (bytes 68 to 79)	23
7.2.19	Profile creator field (bytes 80 to 83)	23
7.2.20	Profile ID field (bytes 84 to 99)	23
7.2.21	Spectral PCS field (bytes 100 to 103)	24
7.2.22	Spectral PCS range field (bytes 104 to 109)	25
7.2.23	Bi-Spectral PCS range field (bytes 110 to 115)	25
7.2.24	MCS field (bytes 116 to 119)	26
7.2.25	Profile/device sub-class (bytes 124 to 127)	26
7.2.26	Reserved field (bytes 124 to 127)	26
7.3	Tag table	26
7.3.1	Overview	26
7.3.2	Tag count (byte position 0 to 3)	27
7.3.3	Tag signature (byte position 4 to 7 and repeating)	27
7.3.4	Offset to beginning of tag data element (byte position 8 to 11 and repeating)	27
7.3.5	Tag data element size (byte position 12 to 15 and repeating)	27
7.4	Tag data	28
8	Required tags	28
8.1	General	28
8.2	Common requirements	28
8.3	Input profiles	28
8.4	Display profiles	29
8.5	Output profiles	29
8.6	DeviceLink profile	30
8.7	ColorEncodingSpace profile	30
8.8	ColorSpace profile	31
8.9	Abstract profile	31
8.10	NamedColor profile	31
8.11	MultiplexIdentification profile	32
8.12	MultiplexLink profile	32
8.13	MultiplexVisualization profile	32
8.14	Precedence order of tag usage	32
8.14.1	General	32
8.14.2	Input, display, output or colour space profile types	32
8.14.3	Abstract profile types	33
8.14.4	DeviceLink profile types	33
8.14.5	MultiplexIdentification profile types	33
8.14.6	MultiplexLink profile types	33
8.14.7	MultiplexVisualization profile types	33
8.14.8	MCS to parameter-based BRDF profile table usage	34
8.14.9	BRDF profile table usage	34
8.14.10	Parameter-based BRDF profile table usage	35
8.14.11	Directional profile table usage	35
9	Tag definitions	36
9.1	General	36
9.2	Specific tag listing	36
9.2.1	AToB0Tag	36
9.2.2	AToB1Tag	37
9.2.3	AToB2Tag	37
9.2.4	AToB3Tag	37
9.2.5	AToM0Tag	37
9.2.6	brdfColorimetricParameter0Tag	38
9.2.7	brdfColorimetricParameter1Tag	38
9.2.8	brdfColorimetricParameter2Tag	38
9.2.9	brdfColorimetricParameter3Tag	39

9.2.10	brdfSpectralParameter0Tag	39
9.2.11	brdfSpectralParameter1Tag	39
9.2.12	brdfSpectralParameter2Tag	40
9.2.13	brdfSpectralParameter3Tag	40
9.2.14	brdfAToB0Tag	40
9.2.15	brdfAToB1Tag	41
9.2.16	brdfAToB2Tag	41
9.2.17	brdfAToB3Tag	41
9.2.18	brdfBToA0Tag	42
9.2.19	brdfBToA1Tag	42
9.2.20	brdfBToA2Tag	43
9.2.21	brdfBToA3Tag	43
9.2.22	brdfBToD0Tag	43
9.2.23	brdfBToD1Tag	44
9.2.24	brdfBToD2Tag	44
9.2.25	brdfBToD3Tag	45
9.2.26	brdfDToB0Tag	45
9.2.27	brdfDToB1Tag	45
9.2.28	brdfDToB2Tag	46
9.2.29	brdfDToB3Tag	46
9.2.30	brdfMToB0Tag	46
9.2.31	brdfMToB1Tag	47
9.2.32	brdfMToB2Tag	47
9.2.33	brdfMToB3Tag	47
9.2.34	brdfMToS0Tag	48
9.2.35	brdfMToS1Tag	48
9.2.36	brdfMToS2Tag	48
9.2.37	brdfMToS3Tag	49
9.2.38	BToA0Tag	49
9.2.39	BToA1Tag	50
9.2.40	BToA2Tag	50
9.2.41	BToA3Tag	50
9.2.42	BToD0Tag	50
9.2.43	BToD1Tag	51
9.2.44	BToD2Tag	51
9.2.45	BToD3Tag	51
9.2.46	calibrationDateTimeTag	52
9.2.47	charTargetTag	52
9.2.48	colorEncodingParamsTag	52
9.2.49	colorSpaceNameTag	52
9.2.50	colorantOrderTag	53
9.2.51	colorantOrderOutTag	53
9.2.52	colorantInfoTag	53
9.2.53	colorantInfoOutTag	53
9.2.54	colorimetricIntentImageStateTag	53
9.2.55	copyrightTag	55
9.2.56	customToStandardPccTag	55
9.2.57	cxftag	56
9.2.58	deviceMfgDescTag	56
9.2.59	deviceModelDescTag	56
9.2.60	directionalAToB0Tag	56
9.2.61	directionalAToB1Tag	57
9.2.62	directionalAToB2Tag	57
9.2.63	directionalAToB3Tag	58
9.2.64	directionalBToA0Tag	58
9.2.65	directionalBToA1Tag	59
9.2.66	directionalBToA2Tag	59
9.2.67	directionalBToA3Tag	59

9.2.68	directionalBToD0Tag	60
9.2.69	directionalBToD1Tag	60
9.2.70	directionalBToD2Tag	61
9.2.71	directionalBToD3Tag	61
9.2.72	directionalDToB0Tag	61
9.2.73	directionalDToB1Tag	62
9.2.74	directionalDToB2Tag	62
9.2.75	directionalDToB3Tag	62
9.2.76	DToB0Tag	63
9.2.77	DToB1Tag	63
9.2.78	DToB2Tag	63
9.2.79	DToB3Tag	64
9.2.80	gamutBoundaryDescription0Tag	64
9.2.81	gamutBoundaryDescription1Tag	64
9.2.82	gamutBoundaryDescription2Tag	64
9.2.83	gamutBoundaryDescription3Tag	64
9.2.84	multiplexDefaultValuesTag	64
9.2.85	multiplexTypeArrayTag	65
9.2.86	measurementInfoTag	65
9.2.87	measurementInputInfoTag	65
9.2.88	mediaWhitePointTag	66
9.2.89	metadataTag	66
9.2.90	MToA0Tag	66
9.2.91	MToB0Tag	67
9.2.92	MToB1Tag	67
9.2.93	MToB2Tag	67
9.2.94	MToB3Tag	68
9.2.95	MToS0Tag	68
9.2.96	MToS1Tag	68
9.2.97	MToS2Tag	69
9.2.98	MToS3Tag	69
9.2.99	namedColorTag	69
9.2.100	perceptualRenderingIntentGamutTag	70
9.2.101	profileDescriptionTag	70
9.2.102	profileSequenceInformationTag	70
9.2.103	referenceNameTag	70
9.2.104	saturationRenderingIntentGamutTag	71
9.2.105	spectralViewingConditionsTag	71
9.2.106	spectralWhitePointTag	71
9.2.107	standardToCustomPccTag	71
9.2.108	surfaceMapTag	72
9.2.109	technologyTag	72

10	Tag type definitions	72
10.1	General	72
10.2	Specific tag type listing	72
10.2.1	colorantOrderType	72
10.2.2	curveType	73
10.2.3	dataType	74
10.2.4	dateTimeType	74
10.2.5	dictType	74
10.2.6	embeddedHeightImageType	76
10.2.7	embeddedNormalImageType	77
10.2.8	float16ArrayType	78
10.2.9	float32ArrayType	79
10.2.10	float64ArrayType	79
10.2.11	gamutBoundaryDescriptionType	79
10.2.12	lutAToBType	80
10.2.13	lutBToAType	83

10.2.14	measurementType	86
10.2.15	multiLocalizedUnicodeType	88
10.2.16	multiProcessElementsType	88
10.2.17	parametricCurveType	89
10.2.18	s15Fixed16ArrayType	91
10.2.19	signatureType	91
10.2.20	sparseMatrixArrayType	91
10.2.21	spectralViewingConditionsType	92
10.2.22	tagArrayType	94
10.2.23	tagStructType	95
10.2.24	u16Fixed16ArrayType	95
10.2.25	uInt16ArrayType	96
10.2.26	uInt32ArrayType	96
10.2.27	uInt64ArrayType	96
10.2.28	uInt8ArrayType	97
10.2.29	utf16Type	97
10.2.30	utf8Type	97
10.2.31	utf8ZipType	97
10.2.32	XYZType	98
10.2.33	zipXmlType	98
11	multiProcessingElementType definitions	99
11.1	General	99
11.2	Specific processing element listing	99
11.2.1	calculatorElement	99
11.2.2	curveSetElement	114
11.2.3	CLUTEElement	117
11.2.4	emissionCLUTEElement	117
11.2.5	emissionMatrixElement	119
11.2.6	emissionObserverElement	121
11.2.7	extendedCLUTEElement	122
11.2.8	inverseEmissionMatrixElement	122
11.2.9	JabToXYZELEMENT	124
11.2.10	matrixElement	125
11.2.11	sparseMatrixElement	125
11.2.12	reflectanceCLUTEElement	126
11.2.13	reflectanceObserverElement	128
11.2.14	tintArrayElement	130
11.2.15	XYZToJabElement	130
11.2.16	“Future” expansion elements	131
12	Struct tag type definitions	132
12.1	General	132
12.2	Struct tag type listing	132
12.2.1	brdfTransformStructure	132
12.2.2	colorantInfoStructure	138
12.2.3	colorEncodingParamsStructure	139
12.2.4	measurementInfoStructure	144
12.2.5	namedColorStructure	146
12.2.6	profileInfoStructure	152
12.2.7	tintZeroStructure	155
13	Tag Array Type definitions	157
13.1	General	157
13.2	Tag array identifier type listing	157
13.2.1	namedColorArray	157
13.2.2	profileInfoArray	157
Annex A (informative)	Elemental calculations and inter-PCS operations	158
Annex B (informative)	Gamut Boundary Description	183