



# SLOVENSKI STANDARD SIST ISO 20677:2020

01-april-2020

---

## Barvno upravljanje upodobitvenih tehnologij - Razširitve za arhitekturo, format profila in podatkovno strukturo

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

### iTeh STANDARD PREVIEW

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

[SIST ISO 20677:2020](https://standards.iteh.ai/catalog/standards/sist/20677-2020/4d32-92af-50ede741adb8/sist-iso-20677-2020)

Ta slovenski standard je istoveten z: **ISO 20677:2019**

#### ICS:

35.240.30	Uporabniške rešitve IT v informatiki, dokumentiranju in založništvu	IT applications in information, documentation and publishing
37.100.99	Drugi standardi v zvezi z grafično tehnologijo	Other standards related to graphic technology

**SIST ISO 20677:2020**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST ISO 20677:2020

<https://standards.iteh.ai/catalog/standards/sist/e937e433-8461-4d32-92af-50ede741adb8/sist-iso-20677-2020>

---

---

**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 STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST ISO 20677:2020](https://standards.iteh.ai/catalog/standards/sist/e937e433-8461-4d32-92af-50ede741adb8/sist-iso-20677-2020)

<https://standards.iteh.ai/catalog/standards/sist/e937e433-8461-4d32-92af-50ede741adb8/sist-iso-20677-2020>



## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST ISO 20677:2020

<https://standards.iteh.ai/catalog/standards/sist/e937e433-8461-4d32-92af-50ede741adb8/sist-iso-20677-2020>



### **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](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
<b>Foreword</b> .....	<b>ix</b>
<b>Introduction</b> .....	<b>x</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms, definitions and abbreviated terms</b> .....	<b>1</b>
3.1 Terms and definitions.....	1
3.2 Abbreviated terms.....	2
<b>4 Extended basic types</b> .....	<b>3</b>
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
<b>5 Conformance</b> .....	<b>9</b>
<b>6 Expanded PCSs, rendering intents and device encoding</b> .....	<b>9</b>
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
<b>7 Profile requirements</b> .....	<b>15</b>
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

## ISO 20677:2019(E)

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
<b>8</b>	<b>Required tags</b>	<b>28</b>
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
<b>9</b>	<b>Tag definitions</b>	<b>36</b>
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

## ISO 20677:2019(E)

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
<b>10</b>	<b>Tag type definitions</b>	<b>72</b>
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
<b>11</b>	<b>multiProcessingElementType definitions</b>	<b>99</b>
11.1	General	99
11.2	Specific processing element listing	99
11.2.1	calculatorElement	99
11.2.2	curveSetElement	114
11.2.3	CLUTElement	117
11.2.4	emissionCLUTElement	117
11.2.5	emissionMatrixElement	119
11.2.6	emissionObserverElement	121
11.2.7	extendedCLUTElement	122
11.2.8	inverseEmissionMatrixElement	122
11.2.9	JabToXYZElement	124
11.2.10	matrixElement	125
11.2.11	sparseMatrixElement	125
11.2.12	reflectanceCLUTElement	126
11.2.13	reflectanceObserverElement	128
11.2.14	tintArrayTypeElement	130
11.2.15	XYZToJabElement	130
11.2.16	“Future” expansion elements	131
<b>12</b>	<b>Struct tag type definitions</b>	<b>132</b>
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
<b>13</b>	<b>Tag Array Type definitions</b>	<b>157</b>
13.1	General	157
13.2	Tag array identifier type listing	157
13.2.1	namedColorArray	157
13.2.2	profileInfoArray	157
<b>Annex A (informative) Elemental calculations and inter-PCS operations</b>		<b>158</b>
<b>Annex B (informative) Gamut Boundary Description</b>		<b>183</b>

## ISO 20677:2019(E)

<b>Annex C</b> (informative) <b>ICC colour appearance model transformations</b> .....	<b>186</b>
<b>Annex D</b> (informative) <b>Named colour profiles</b> .....	<b>188</b>
<b>Annex E</b> (informative) <b>Sparse matrix operations</b> .....	<b>190</b>
<b>Annex F</b> (informative) <b>calculatorElement text representation and examples</b> .....	<b>194</b>
<b>Annex G</b> (informative) <b>BRDF overview and description</b> .....	<b>198</b>
<b>Annex H</b> (informative) <b>Directional emissive colour</b> .....	<b>208</b>
<b>Annex I</b> (informative) <b>Multiplex connection spaces</b> .....	<b>209</b>
<b>Annex J</b> (informative) <b>ColorEncodingSpace profiles</b> .....	<b>214</b>
<b>Annex K</b> (informative) <b>Workflow scenarios and CMM processing control options</b> .....	<b>215</b>
<b>Bibliography</b> .....	<b>220</b>

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST ISO 20677:2020](https://standards.iteh.ai/catalog/standards/sist/e937e433-8461-4d32-92af-50ede741adb8/sist-iso-20677-2020)

<https://standards.iteh.ai/catalog/standards/sist/e937e433-8461-4d32-92af-50ede741adb8/sist-iso-20677-2020>

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 130, *Graphic technology*, in cooperation with the International Color Consortium (ICC).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

### 0 General

This document defines specifications that provide a platform for defining extended (iccMAX) colour management profiles and systems for various colour workflow domains. It can be thought of as an extension to ISO 15076-1, defined by the International Color Consortium® (ICC). ISO 15076-1 specifies a profile format that is intended to provide a cross-platform profile format for the creation and interpretation of colour data. Central to ISO 15076-1 is the encoding of colour transforms between device colour encodings and profile connection spaces (PCSs) based upon D50 colorimetry with the CIE 1931 Standard 2-degree observer. For many workflows ISO 15076-1 has proven adequate for defining successful colour management systems. For other workflows ISO 15076-1 has been found to be limited in the flexibility of encoding colour transforms as well as defining means of profile colour connection that incorporate physical attributes of colour in addition to mere colour appearance.

The intent of this document is to provide a platform on which domain-specific specifications can be defined that make use of these extensions to the existing cross-platform profile format of ISO 15076-1. Thus, there is greater flexibility for defining colour transforms and PCSs to meet needs that cannot easily be met with ISO 15076-1. As such, it is not envisioned that all colour management systems that use this document will implement all the features or capabilities specified by this document. Specific requirements related to what is necessary to be implemented and supported relative to this document can be found in workflow domain specifications. Additionally, for some domain-specific workflows it is envisioned that there will be the need for simultaneous support for and interaction between ISO 15076-1 and profiles defined by this document.

It is assumed that the reader of this document has a good understanding of ISO 15076-1 as well as a good understanding of colour science and imaging, such as familiarity with CIE, ISO and IEC colour standards, general knowledge of device measurement and characterization, and familiarity with at least one operating system level colour management system.

The following subclauses introduce a few of the more significant differences from ISO 15076-1.

### 0.1 Extended profile connection spaces

#### 0.1.1 ISO 15076-1 PCS encoding

In ISO 15076-1 PCS transform results are encoded relative to D50 with a 2-degree observer. If and when ISO 15076-1-based profiles are used in conjunction with this document, the PCS encoding specified in ISO 15076-1 are used with necessary conversions as needed.

#### 0.1.2 Extended PCS encoding

PCS encoding is extended to allow PCS transform results to be relative to arbitrary illuminants and observers. Profile connection conditions (PCC) provided by either a profile or directly to the colour management module (CMM) can be applied to convert between different illuminants and observers. Additionally, a profile can define use of a spectrally-based PCS independent of the colorimetric-based PCS usage, with separate transform data between device encoding and the colorimetry and spectral PCS encodings.

### 0.2 Extended transform encoding

#### 0.2.1 ISO 15076-1 transform encoding

ISO 15076-1 defines transforms using integer encoding in AToBx and BToAx tags. Floating point transform encoding can additionally be specified in optional DToBx and BToDx tags using multi-processing element tags.

Integer-based LUT tags have specific requirements for transform data and order.

The multi-processing element tag type allows a sequence of transform elements to be applied in order to transform between device encoding and PCS encoding. The processing elements consist of matrices, one-dimensional curve sets and  $n$ -dimensional lookup tables.

### 0.2.2 iccMAX extended transform encoding

Spectrally-based PCS transforms are encoded using DToBx/BToDx tags when a spectral PCS is used. Colorimetric-based PCS transforms are encoded in matrix/TRC based profiles or AToBx/BToAx tags. Additionally, AToBx/BToAx tag transforms can be encoded using the multi-processing element tag type.

The multi-processing element tag type is extended to provide greater flexibility as well as encoding brevity in defining transforms. Extended elements include a stack-based programmable transform calculator, single-segment curves, N-D lookup tables with integer encoding, colour appearance model (CAM) conversions, sparse matrix processing and tint arrays.

Multi-processing element-based tags are used to define PCC within a profile. The CMM applies these tags as needed to perform PCS conversions.

### 0.2.3 Late-binding processing elements

The multi-processing element tag type has been extended to allow for processing elements that provide late-binding of the observer and/or illuminant from the PCC utilized by the profile. Either spectral information inside select processing elements is converted to colorimetric data shortly before processing of colour transforms is to be performed, or spectral to colorimetric transforms are established for processing of colour transformations. This late-binding of spectral to colorimetric processing is based on the PCC utilized by the multi-processing element. The media-white point and illuminant colorimetry used for absolute/relative PCS processing is also adjusted based upon the combined profile/PCC relationships when late-binding processing elements are used.

## 0.3 Colour encoding space profiles

### 0.3.1 General <https://standards.iteh.ai/catalog/standards/sist/e937e433-8461-4d32-92af-50ede741adb8/sist-iso-20677-2020>

In ISO 15076-1, profiles define transforms that go from device to PCS. However, in some workflows the essential requirement is a method of defining what the data are rather than providing a transform that converts the data into a representation of colour.

### 0.3.2 Colour space encoding

This document establishes a ColorEncodingSpace profile class to define profiles that can be used when the content owner wishes to identify the colour encoding of digital colour content and does not wish to provide a colour transformation to be used in converting or adapting the digital colour content from the identified current colour space encoding to any other colour space encoding.

## 0.4 Multiplex connection space profiles

### 0.4.1 General

Generally, the data encoding sides of profile transforms are not used to connect profiles using ISO 15076-1. Connection of data encoding channels is only meaningful when the number, order and encoding of the data encoding channels are identical. However, in some workflows, flexibility in the number and order of the channels is desirable with a meaningful way of identifying the encoding of the channels.

### 0.4.2 Multiplex connection space encoding

This document defines an additional profile connection mechanism that allows multiplex connection space (MCS) channels to be connected. MCS connection provides a means of defining flexible connection between “device like” channels of profiles that are identified by name. Order and existence of channels is flexible with the ability for a profile to specify subset requirements on the MCS channels in the connected profile and default values specified for missing channels. The input profile class

**ISO 20677:2019(E)**

has been extended to have an optional tag that connects to an MCS. Additionally, MultiplexLink and MultiplexVisualization profile classes have been defined for MCS processing.

**0.5 Bidirectional reflection distribution function (BRDF) and directional emission profiles****0.5.1 General**

ISO 15076-1 assumes 0:45 measurement geometry for reflection prints and diffuse radiance of displays. However, in many conditions colour appearance can change due to changes in lighting or viewing angle. Such goniochromatic effects cannot be encoded or communicated using ISO 15076-1.

**0.5.2 Bidirectional reflection distribution function encoding**

This document provides the ability to encode bidirectional reflection distribution function (BRDF) information, as well as example surface information, that 3D rendering systems can use to emulate goniochromatic effects. In this case the BRDF information is provided directly to the 3D rendering system without extensive colour management system involvement. Additionally, BRDF information can be used to define and communicate goniochromatic properties of named colours.

**0.5.3 Directional emission function encoding**

This document provides the ability to encode directional emission information which can be used to define and communicate goniochromatic properties of colours by viewing angle and relative position on a display.

**0.6 Rendering intents**

In ISO 15076-1 four rendering intents are defined: perceptual, media-relative colorimetry, ICC-absolute colorimetry and saturation. For the purposes of supporting spectrally-based PCSs, the media-relative colorimetry and ICC-absolute colorimetry intents are referred to in this document as media-relative and ICC-absolute intents which apply to both colorimetric as well as spectral conditions.

<https://standards.iteh.ai/catalog/standards/sist/e937e433-8461-4d32-92af-50ede741adb8/sist-iso-20677-2020>

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

## 1 Scope

This document is based on ISO 15076-1, and describes an expanded profile specification and profile connections that permit greater flexibility and functionality than ISO 15076-1. All definitions and requirements in ISO 15076-1 are therefore in force unless otherwise specified by this document. This document defines minimum structural and operational requirements for writing and reading ICC profiles. Additional workflow requirements and restrictions are defined in domain-specific interoperability conformance specification (ICS) documents approved and registered by the ICC.

In this document, some ISO 15076-1 types have been removed, and others have been added. A colour management module (CMM) compatible with profiles conforming to this document will have backwards compatibility with profiles conforming to ISO 15076-1.

Where the name of a type in this document is the same as a type in ISO 15076-1, the type definition is based on the ISO 15076-1 definition. The exception is the definition of the MPE type, which has been expanded.

Where the extensions described in this document are not required in a particular workflow, ISO 15076-1 is used as the basis for colour management profiles and architectures.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15076-1, *Image technology colour management — Architecture, profile format and data structure — Part 1: Based on ICC.1:2010*

ISO 17972-1, *Graphic technology — Colour data exchange format — Part 1: Relationship to CxF3 (CxF/X)*

## 3 Terms, definitions and abbreviated terms

### 3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

#### 3.1.1

##### profile connection conditions

##### PCC

information used to define illuminant, observer for PCS along with transforms to convert to and from custom colorimetry and standard D50 colorimetry for the standard 2° observer