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AES standard for audio metadata— Audio object structures for preservation and restoration

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AES standard for audio metadata - Audio object structures for preservation and restoration

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Abstract

This standard provides a vocabulary to be used in describing structural and administrative metadata for digital and analog audio formats for the purpose of enabling audio preservation activities on those objects. Some implementations also refer to this metadata as technical metadata. The characteristics of the audio objects captured by this standard may be of use to audio communities beyond the audio preservation community.

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Foreword

This foreword is not part of the AES57-2011 *AES standard for audio metadata - Audio object structures for preservation and restoration*.

Work on this project began in earnest in 2002 following a series of meetings that the chair attended at the Library of Congress in which the subject of technical metadata requirements for audio were discussed. Over the intervening years the document has undergone multiple rewrites culminating in a close draft which appeared sometime around 2007. That document since has undergone a small number of revisions that principally refine element sets that can be applied to specific media types.

At the time of public approval, the membership of the task group was D. Ackerman, P. Alyea, G. Blood, P. Cabe, M. Casey, C. Chambers, B. Gordon, B. Hoffa, C. Lacinak, B. McCoy, M. Miller, J. Narus, D. Nolan, D. Sbardella, M. Sueiro, P. Treleaven, and T. Vaervagen.

Note on normative language

In AES standards documents, sentences containing the word “shall” are requirements for compliance with the document. Sentences containing the verb “should” are strong suggestions (recommendations). Sentences giving permission use the verb “may”. Sentences expressing a possibility use the verb “can”.



AES standard for audio metadata - Audio object structures for preservation and restoration

Introduction

This standard sets out the vocabulary to be used in describing digital and analog audio formats, including both those formats that exist in some tangible form such as a reel of tape and those that exist only as a set of bits, untied to a single audio carrier, such as a broadcast wave file. This vocabulary takes the form of an Extensible Markup Language (XML) schema. By doing so it provides a structured human readable instance document that can be easily parsed and manipulated using any of a number of freely available programming libraries and tools. The schema is designed for flexibility, providing a number of data elements that are optional. This is necessary since often there will be certain information that cannot be known, particularly in archive settings where technicians are asked to preserve materials that have little or no accompanying documentation. As a result the base set of required elements does not necessarily represent the minimal description necessary for preservation, but rather is the set of elements that is expected to be known or determinable at a minimum.

0 Preamble

0.1 Documentation conventions

0.1.1 Decimal points

According to IEC directives, the comma is used in all text to indicate the decimal point. However, in the specified coding, including the examples shown, the full stop is used as in IEC programming language standards.

0.1.2 Data representation

In this standard, all coding and data representations are printed in an equally spaced font. For example, "**dimensions**". Inherited elements and attributes are printed in an italicized equally spaced font.

0.1.3 Case sensitivity

All element, attribute, data type and constant names shall be case sensitive.

0.2 Logical conventions and data types

In this standard, all elements, attributes and custom data types are defined in the lower-camel-case coding convention. For example, "**lowerCamelCase**".



This standard is implemented as an Extensible markup language (XML) schema according to the W3C XML schema recommendation. The full listing in schema format is provided in this document's appendices.

This standard relies on a number of data types that are defined by the W3C. See clause 2 *Normative references*. The following W3C data types are used:

dateTime
ID
IDREF
IDREFS
integer
long
nonNegativeInteger
positiveInteger
string

Additionally, this standard defines a number of custom data types according to the rules of the W3C's XML schema recommendation. These types are defined throughout the text as they are encountered in the element and attribute definition listings.

1 Scope

This standard concerns the technical documentation of audio files and physical audio formats for long-term archival storage and preservation. This documentation, referred to as metadata from here on, provides both a physical description of the media, as well as a general vocabulary for describing the audio characteristics or sound essence of the format. This standard also provides a minimal amount of descriptive metadata to aid in relating the instance document back to the described audio object.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this document. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this document are encouraged to investigate the possibility of applying the most recent editions of the indicated standards.

AES31-3-1999, *AES standard for network and file transfer of audio — Audio-file transfer and exchange — Part 3: Simple project interchange*. Audio Engineering Society, New York, NY., US.

W3C XML Schema Part 1: Structures Second Edition, *W3C Recommendation 28 October 2004*. www.w3.org

W3C XML Schema Part 2: Datatypes Second Edition, *W3C Recommendation 28 October 2004*. www.w3.org

W3C XML Linking Language (XLink) Version 1.1, *W3C Recommendation 06 May 2010*. www.w3.org



3 Definitions and abbreviations

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

3.1

Audio object

A general term used to describe physical audio carriers, and digital audio in the form of files and streams.

For the purposes of this document, the term physical audio carriers shall be understood to mean only those carriers to which an audio data essence is intrinsically bound to the physical object. For example, an audio DAT tape is a physical digital audio object. Wave files on the other hand are file based digital audio objects. They can be moved, copied, and renamed without the need to play the audio essence. In the latter case, the file exists on a storage device, but it is not intrinsically bound to that device. Therefore there is no need to describe the physical storage given its transient nature.

3.2

Instance Document

A document that conforms to the minimally required set of elements and attributes defined by an XML schema.

4 Audio Object Document structure

4.1 One-to-one mapping

Each audio object is described by a single instance document in a strict one-to-one mapping. For the purposes of this standard, an audio object shall be defined as either a single physical item or a single digital file.

Sometimes a high level meta-relationship exists between two or more audio objects. For example, two files meant to be played together to form a stereo image. In such cases, each file shall have its own audio object instance document populated with values that are scoped to that file only.

The association of two or more sound files that are meant to be played together is outside the scope of this standard. Other standards exist that address such high level structural metadata.

4.2 Document hierarchy

Instance documents conforming to the audio object schema are hierarchical in design. There are four primary levels of hierarchy that together describe the structure of the audio object. The top level of the document is the **audioObject** section. Beneath this is the **face** section. Beneath the **face** section is the **region** section. Finally, beneath the **region** section is the **stream** section. The **face**, **region** and **stream** sections can each be repeated in accordance with proper xml schema syntax.

4.3 Base element super-class

The **objectType** element is an abstract super-class that provides an XML **ID** attribute to all elements that it contains as subclasses. Care shall be taken to ensure that the **ID** attribute is a unique value within the instance document. Further, since the instance document may be included in other xml documents, problems can occur if two instance documents share the same values for **ID** attributes. Therefore **ID** attributes should be made unique both within and across instance documents.

4.4 Document root

The root of the instance document is the **audioObject** element. All other elements in the instance document shall be contained between the **<audioObject>** and **</audioObject>** tags. The **audioObject** element is a subclass of the **objectType** element.

The **audioObject** element may contain the following sub-elements and attributes:



KIND	NAME	DATA TYPE	OCCURS		DEFAULT VALUE
			MIN	MAX	
ELEMENT	format	formatType	1	1	NONE
ELEMENT	physicalProperties	physicalPropertiesType	0	1	NONE
ELEMENT	appSpecificData	appSpecificDataType	0	Unbounded	NONE
ELEMENT	audioDataEncoding	string	0	1	NONE
ELEMENT	byteOrder	byteOrderType	0	1	NONE
ELEMENT	firstSampleOffset	long integer	0	1	NONE
ELEMENT	audioDataBlockSize	long integer	0	1	NONE
ELEMENT	firstValidByteOfBlock	long integer	0	1	NONE
ELEMENT	lastValidByteOfBlock	long integer	0	1	NONE
ELEMENT	use	useType	1	Unbounded	NONE
ELEMENT	primaryIdentifier	identifierType	1	1	NONE
ELEMENT	secondaryIdentifier	identifierType	0	Unbounded	NONE
ELEMENT	fileChecksum	checksumType	0	1	NONE
ELEMENT	soundDataChecksum	checksumType	0	1	NONE
ELEMENT	objectLink	locStringType	0	1	NONE
ELEMENT	face	faceType	1	Unbounded	NONE
ELEMENT	formatList	formatRegionListType	1	1	NONE
ELEMENT	objectCreationDate	dateTime	0	1	NONE
ATTRIBUTE	title	string	0	1	NONE
ATTRIBUTE	analogDigitalFlag	analogDigitalFlagType	1	1	NONE
ATTRIBUTE	generation	string	0	1	NONE
ATTRIBUTE	disposition	string	1	1	NONE
ATTRIBUTE	schemaVersion	string	1	1	1.0.0
ATTRIBUTE	ID	ID	1	1	NONE

4.4.1 format

The first element within the **audioObject** section shall be the format element. This element shall be used to indicate the standard recognized name for the format of the audio object described by the instance document. This element shall be required. This element is of data type **formatType** which is described in section 4.4.1.1.

4.4.1.1 formatType

The **formatType** is a string with one optional attribute. The attribute **specificationVersion** can be used to declare the version of the format if one exists. If the **specificationVersion** is not known or is not applicable, then the **specificationVersion** attribute shall be omitted.

4.4.2 physicalProperties

The **physicalProperties** element may appear as the second sub-element of the **audioObject** section (see 4.4) or may appear as the first sub element of the **formatRegion** element (see 4.4.17.2). This element is optional in both cases.

When present, the **physicalProperties** element is used to describe the physical characteristics of the audio object. When the element appears within the **audioObject** element, the information given shall be applied globally to the entire audio object. However, when the element appears within the **formatRegion** element, the information given shall be applied only to the parts of the audio object described by the enclosing **formatRegion** element. If the **physicalProperties** element appears both within the **audioObject** element and in a **formatRegion** element, then the data given in the instance within the **formatRegion** masks or overrides the data given globally for the audio object when there is a conflict or difference. If the audio object under description has no permanent physical manifestation (such as a digital file) or its physical characteristics cannot be determined, then the **physicalProperties** element shall be omitted.



4.4.2.1 physicalPropertiesType

The **physicalPropertiesType** is comprised of up to three sub-elements.

KIND	NAME	DATA TYPE	MIN OCCURS	MAX OCCURS	DEFAULT VALUE
ELEMENT	xsd:choice	physicalStructureType	0	1	NONE
ELEMENT	dimensions	dimensionType	1	1	NONE
ELEMENT	shellDimensions	dimensionType	0	1	NONE

4.4.2.1.1 choice of physicalStructureType

One of four sub-class elements of the abstract data type **physicalStructureType** (see 4.4.2.1.1.1) may be included under the choice element. The four sub-class elements that are defined are **tapeStructure** (see 4.4.2.1.1.2), **opticalStructure** (see 4.4.2.1.1.3), **analogDiscStructure** (see 4.4.2.1.1.4), and **cylinderStructure** (see 4.4.2.1.1.5).

These elements define the physical makeup of an audio object that is comprised of one or more substrate layers. Each sub-class of the **physicalStructureType** is specific to a particular family of media types.

4.4.2.1.1.1 physicalStructureType

The **physicalStructureType** data type is an abstract data type, provided to give a common superclass to the **tapeStructure** (see 4.4.2.1.1.2), **opticalStructure** (see 4.4.2.1.1.3), **analogDiscStructure** (see 4.4.2.1.1.4), and **cylinderStructure** (see 4.4.2.1.1.5) elements.

The **physicalStructureType** cannot itself be instantiated, but shall be represented by one of the previously mentioned subclasses.

4.4.2.1.1.2 tapeStructure

The **tapeStructure** element shall be used to describe the physical makeup of either an analog or digital audio tape. The **tapeStructure** element is of type **tapeStructureType** (see 4.4.2.1.1.2.2).

4.4.2.1.1.2.2 tapeStructureType

The **tapeStructureType** data type shall be comprised of three required elements of the **layerType** data type (see 4.4.2.1.1.2.2.1.1), and may include one optional element and one optional attribute.

KIND	NAME	DATA TYPE	MIN OCCURS	MAX OCCURS	DEFAULT VALUE
ELEMENT	backcoatLayer	layerType	0	1	NONE
ELEMENT	substrateMaterialLayer	layerType	1	1	NONE
ELEMENT	binderLayer	layerType	1	1	NONE
ELEMENT	oxideCoatingLayer	layerType	1	1	NONE
ATTRIBUTE	stockBrand	String	0	1	NONE

4.4.2.1.1.2.2.1 backcoatLayer

This element shall be used to provide information about the backing of the tape media. If the tape has no backing, then this element may be omitted. **backcoatLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1).



4.4.2.1.1.2.2.1.1 layerType

The **layerType** data type shall be comprised of two required attributes, and may include one optional element and one optional attribute. These provide information about the composition, thickness, position in the overall media layer structure, and role of the described layer.

KIND	NAME	DATA TYPE	MIN OCCURS	MAX OCCURS	DEFAULT VALUE
ELEMENT	thickness	measurementType	0	1	NONE
ATTRIBUTE	composition	string	0	1	NONE
ATTRIBUTE	role	roleType	1	1	NONE
ATTRIBUTE	order	integer	1	1	NONE

4.4.2.1.1.2.2.1.1.1 thickness

The **thickness** element may be used to indicate the thickness of the described media layer. The **thickness** element is of type **measurementType** (see 4.4.2.1.4.2).

4.4.2.1.1.2.2.1.1.2 composition

The **composition** attribute shall be used to indicate the makeup of the described media layer. If the layer's composition is unknown then the **composition** attribute shall be omitted.

4.4.2.1.1.2.2.1.1.3 role

The **role** attribute shall be used to indicate the primary purpose the media layer serves in the overall media object. The role shall be specified as one of the predefined constants defined by the **roleType** data type (see 4.4.2.1.1.2.2.1.1.3.1).

4.4.2.1.1.2.2.1.1.3.1 roleType

The **roleType** is a list of restricted string values that may be used to indicate the primary purpose a media layer serves. The possible values are:

LABEL_LAYER	layer designed for the labeling or printing on the media object
PROTECTIVE_LAYER	designed to shield a DATA_LAYER from harm
DATA_LAYER	contains the data essence for the media object
PROTECTIVE_DATA_LAYER	protective layer that also contains the data essence of the media object
SUPPORT_LAYER	a layer designed to provide physical support to the media object

4.4.2.1.1.2.2.1.1.4 order

The **order** attribute shall be used to indicate where the described media layer exists within the layered media object sandwich. Generally, layered media objects consist of either a mirrored layer structure, where a substrate exists in the center of the object with layers added to each side, or as a non-mirrored layer structure where a substrate or backing layer exists on one side of the object, with additional layers added in one direction only. There are however, some formats such as tape, that have layers on each side of the substrate in a non-mirrored configuration. In all cases the primary substrate layer shall be defined with an **order** of 0.



All layers added beneath the substrate layer shall have their order incremented in steps of 1 according to the place within the overall layer sandwich that they occur. All layers on top of the primary substrate shall have their order decremented in steps of 1 according to the place within the overall layer sandwich that they occur. See figures 1a and 1b.

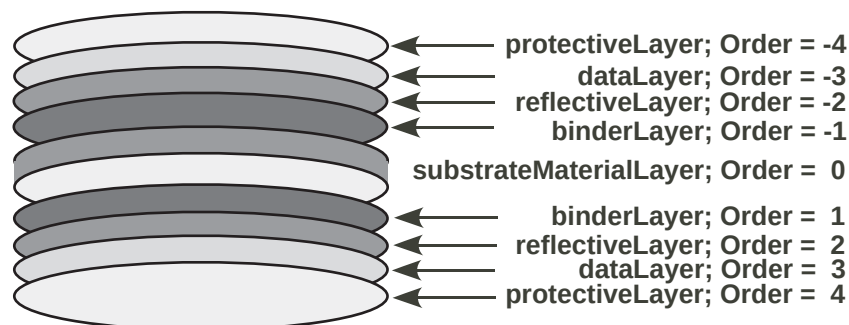


Figure 1a - Layer order

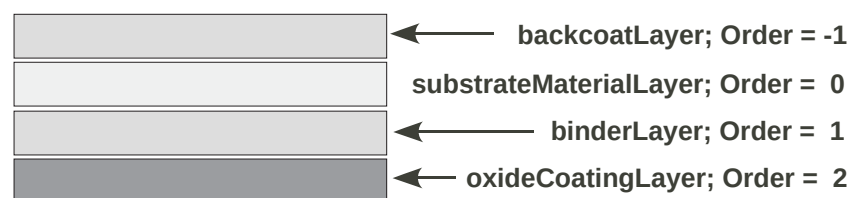


Figure 1b – Tape Layer order

4.4.2.1.1.2.2.2 substrateMaterialLayer

This element shall be used to provide information about the base film of the tape media. **substrateMaterialLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1).

4.4.2.1.1.2.2.3 binderLayer

This element shall be used to provide information about the binder used in the tape media. **binderLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1).

4.4.2.1.1.2.2.4 oxideCoatingLayer

This element shall be used to provide information about the oxide coating used in the tape media. **oxideCoatingLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1).

4.4.2.1.1.2.2.5 stockBrand

The **stockBrand** attribute may be used to identify the manufacturer and product name for the described audio object. When included, the manufacturer name and product name shall be concatenated, separated by spaces, in the form "MANUFACTURER PRODUCT_NAME". If the stock brand is unknown, the **stockBrand** element shall be omitted.

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4.4.2.1.1.3 opticalStructure

The **opticalStructure** element shall be used to describe the physical makeup of an optical disc recording. The **opticalStructure** element is of type **opticalStructureType** (see 4.4.2.1.1.3.1).



4.4.2.1.1.3.1 opticalStructureType

The **opticalStructureType** data type shall be comprised of four required elements of the **layerType** data type (see 4.4.2.1.1.2.2.1.1), and may include one optional element and one optional attribute.

KIND	NAME	DATA TYPE	MIN OCCURS	MAX OCCURS	DEFAULT VALUE
ELEMENT	substrateMaterialLayer	layerType	1	unbounded	NONE
ELEMENT	binderLayer	layerType	1	unbounded	NONE
ELEMENT	reflectiveLayer	layerType	1	unbounded	NONE
ELEMENT	dataLayer	layerType	1	unbounded	NONE
ELEMENT	protectiveLayer	layerType	0	unbounded	NONE
ATTRIBUTE	stockBrand	String	0	1	NONE

4.4.2.1.1.3.1.1 substrateMaterialLayer

This element shall be used to provide information about the base substrate of the optical media. **substrateMaterialLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1).

4.4.2.1.1.3.1.2 binderLayer

This element shall be used to provide information about the binder used in the optical media. **binderLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1).

4.4.2.1.1.3.1.3 reflectiveLayer

This element shall be used to provide information about the reflective substrate of the optical media. **reflectiveLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1).

4.4.2.1.1.3.1.4 dataLayer

This element shall be used to provide information about the substrate of the optical media that stores the audio data. **dataLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1).

4.4.2.1.1.3.1.5 protectiveLayer

This element shall be used to provide information about the protective surface of the optical media. **protectiveLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1).

4.4.2.1.1.3.1.6 stockBrand

The **stockBrand** attribute may be used to identify the manufacturer and product name for the described audio object. See 4.4.2.1.1.2.2.5.

4.4.2.1.1.4 analogDiscStructure

The **analogDiscStructure** element shall be used to describe the physical makeup of an analog audio disc recording. The **analogDiscStructure** element is of type **analogDiscStructureType** (see 4.4.2.1.1.4.1).

4.4.2.1.1.4.1 analogDiscStructureType

The **analogDiscStructureType** data type shall be comprised of one required elements of the **layerType** data type (see 4.4.2.1.1.2.2.1.1), and may include one optional element.



KIND	NAME	DATA TYPE	MIN OCCURS	MAX OCCURS	DEFAULT VALUE
ELEMENT	substrateMaterialLayer	layerType	1	1	NONE
ELEMENT	fillerLayer	layerType	0	unbounded	NONE
ELEMENT	surfaceLayer	layerType	0	1	NONE
ATTRIBUTE	stockBrand	String	0	1	NONE

4.4.2.1.1.4.1.1 substrateMaterialLayer

This element shall be used to provide information about the base substrate of the analog disc media. **substrateMaterialLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1).

4.4.2.1.1.4.1.2 fillerLayer

This element shall be used to provide information about the inner core of an analog disc recording for those media where one is present - see figures 2a and 2b. **fillerLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1). If the media has no inner core, other than the base material itself, then this element shall be omitted.

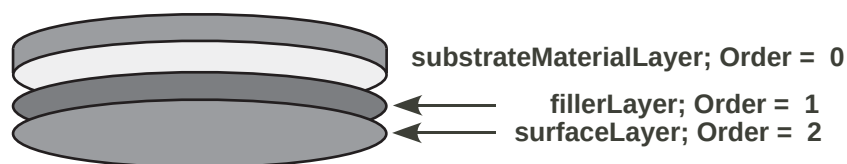


Figure 2a - Disc with filler layer

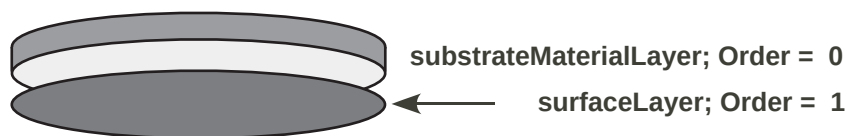


Figure 2b - Disc with no filler layer

4.4.2.1.1.4.1.3 surfaceLayer

This element shall be used to provide information about the surface of the analog disc media. **surfaceLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1).

4.4.2.1.1.4.1.4 stockBrand

The **stockBrand** attribute may be used to identify the manufacturer and product name for the described audio object. See 4.4.2.1.1.2.2.5.

4.4.2.1.1.5 cylinderStructure

The **cylinderStructure** element shall be used to describe the physical makeup of a cylinder recording. The **cylinderStructure** element is of type **cylinderStructureType** (see 4.4.2.1.1.5.1).

4.4.2.1.1.5.1 cylinderStructureType

The **cylinderStructureType** data type shall be comprised of two required elements, and may include one optional element, of the **layerType** data type (see 4.4.2.1.1.2.2.1.1).



KIND	NAME	DATA TYPE	MIN OCCURS	MAX OCCURS	DEFAULT VALUE
ELEMENT	substrateMaterialLayer	layerType	1	1	NONE
ELEMENT	fillerLayer	layerType	0	unbounded	NONE
ELEMENT	surfaceLayer	layerType	1	1	NONE
ATTRIBUTE	stockBrand	String	0	1	NONE

4.4.2.1.1.5.1.1 substrateMaterialLayer

This element shall be used to provide information about the base substrate of the cylinder media. **substrateMaterialLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1).

4.4.2.1.1.5.1.2 fillerLayer

This element shall be used to provide information about the inner core of a cylinder recording for those media where one is present. **fillerLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1). If the media has no inner core, other than the base material itself, then this element shall be omitted.

4.4.2.1.1.5.1.3 surfaceLayer

This element shall be used to provide information about the surface of the cylinder media. **surfaceLayer** is of data type **layerType** (see 4.4.2.1.1.2.2.1.1).

4.4.2.1.1.5.1.4 stockBrand

The **stockBrand** attribute may be used to identify the manufacturer and product name for the described audio object. See 4.4.2.1.1.2.2.5.

4.4.2.1.2 dimensions

The **dimensions** element may be used to provide physical measurements of the audio object. The **dimensions** element shall only be used to describe the part of the audio object that carries the audio signal (that is: the tape, or wire, or disc itself). Some objects are contained within a shell or reel that may also be measured using the **shellDimensions** element.

The **dimensions** element's data type is the abstract data type **baseDimensionsType** (see 4.4.2.1.2.1 **baseDimensionsType**). There are a series of derived elements that are format-specific that may be used to describe the dimensions of the audio object. There is also a generic **dimensionsType** data type derived from the abstract **baseDimensionsType** that should be used as an element for describing the dimensions of a physical audio object that does not fit into any of the predefined format-specific instantiations.

In order to facilitate uniform data across institutions the following guidelines shall be followed when describing physical audio objects using the provided format specific data types.

Physical structure	Sub-elements
TAPE	width shall be used to describe the width of the tape as seen between the two flanges of the tape reel.
TAPE	length shall be used to describe the length of the tape unwound from the reel. Or put another way, the amount of tape played past the tape head from the head to the tail of the tape.
TAPE	thickness shall be used to describe the total thickness of the tape.



ANALOG DISC or OPTICAL DISC	diameter shall be used to describe the distance of two opposite points on the edge of the object. By definition, a line drawn between these two points will pass through the center of the object.
ANALOG DISC or OPTICAL DISC	thickness shall be used to describe the distance from the back of the disc to the top of the disc, when the disc is lying flat.
WIRE	diameter shall be used to describe the diameter of the wire as seen from straight on, i.e. looking down the wire from one end to the other.
WIRE	length shall be used to describe the length of the wire unwound from the spool. Or put another way, the amount of wire played past the pickup from the head to the tail of the wire.
CYLINDER	diameter shall be used to describe the distance of two opposite points on the edge of the cylinder, when stood on end. By definition, a line drawn between these two points will pass through the center of the object.
CYLINDER	length shall be used to describe the length of the cylinder from end to end.

These combinations are provided by the schema as a series of data types that share the common super class element **baseDimensionsType** (see 4.4.2.1.2.1).

4.4.2.1.2.1 baseDimensionsType

The **baseDimensionsType** type shall be an abstract element that serves as a root super class to **tapeDimensionsType**, **wireDimensionsType**, **analogDiscDimensionsType**, **opticalDiscDimensionsType**, **cylinderDimensionsType**, **dimensionsType**, and the **shellDimensionsType**.

4.4.2.1.2.1.1 tapeDimensionsType

The **tapeDimensionsType** type may be comprised of three optional sub-elements. They are:

KIND	NAME	DATA TYPE	MIN OCCURS	MAX OCCURS	DEFAULT VALUE
ELEMENT	width	measurementType	0	1	NONE
ELEMENT	length	measurementType	0	1	NONE
ELEMENT	thickness	measurementType	0	1	NONE

This data type should be used when describing the measurements of a tape on, for example, a reel.

4.4.2.1.2.1.2 wireDimensionsType

The **wireDimensionsType** type may be comprised of two optional sub-elements. They are:

KIND	NAME	DATA TYPE	MIN OCCURS	MAX OCCURS	DEFAULT VALUE
ELEMENT	diameter	measurementType	0	1	NONE
ELEMENT	length	measurementType	0	1	NONE

This data type should be used when describing the measurements of a wire recording.



4.4.2.1.2.1.3 analogDiscDimensionsType

The **analogDiscDimensionsType** type may be comprised of three optional sub-elements. They are:

KIND	NAME	DATA TYPE	MIN OCCURS	MAX OCCURS	DEFAULT VALUE
ELEMENT	shape	string	0	1	NONE
ELEMENT	diameter	measurementType	0	1	NONE
ELEMENT	thickness	measurementType	0	1	NONE

This data type should be used when describing the measurements of an analog sound disc recording.

4.4.2.1.2.1.4 opticalDiscDimensionsType

The **opticalDiscDimensionsType** type may be comprised of three optional sub-elements. They are:

KIND	NAME	DATA TYPE	MIN OCCURS	MAX OCCURS	DEFAULT VALUE
ELEMENT	shape	string	0	1	NONE
ELEMENT	diameter	measurementType	0	1	NONE
ELEMENT	thickness	measurementType	0	1	NONE

This data type should be used when describing the measurements of an optical disc recording.

4.4.2.1.2.1.5 cylinderDimensionsType

The **cylinderDimensionsType** type may be comprised of two optional sub-elements. They are:

KIND	NAME	DATA TYPE	MIN OCCURS	MAX OCCURS	DEFAULT VALUE
ELEMENT	diameter	measurementType	0	1	NONE
ELEMENT	length	measurementType	0	1	NONE

This data type should be used when describing the measurements of a cylinder recording.

4.4.2.1.2.1.6 shellDimensionsType

The **shellDimensionsType** type may be comprised of four sub-elements. They are:

KIND	NAME	DATA TYPE	MIN OCCURS	MAX OCCURS	DEFAULT VALUE
ELEMENT	length	measurementType	0	1	NONE
ELEMENT	width	measurementType	0	1	NONE
ELEMENT	depth	measurementType	0	1	NONE
ELEMENT	diameter	measurementType	0	1	NONE

This data type should be used when describing the measurements of a recording's shell or reel. See figure 3. See also 4.4.2.1.3.

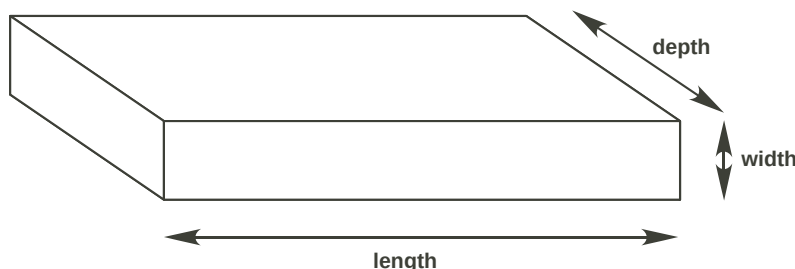


Figure 3 - Shell-dimensions

