
**Information technology — Media context
and control —**

**Part 6:
Common types and tools**

*Technologies de l'information — Contrôle et contexte de supports —
Partie 6: Types communs et outils*





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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

ISO/IEC 23005-6 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

ISO/IEC 23005 consists of the following parts, under the general title *Information technology — Media context and control*:

- *Part 1: Architecture*
- *Part 2: Control information*
- *Part 3: Sensory information*
- *Part 4: Virtual world object characteristics*
- *Part 5: Data formats for interaction devices*
- *Part 6: Common types and tools*
- *Part 7: Conformance and reference software*

Introduction

ISO/IEC 23005 (MPEG-V) provides an architecture and specifies associated information representations to enable interoperability between virtual worlds, e.g. digital content provider of a virtual world, (serious) gaming, simulation, DVD, and with the real world, e.g. sensors, actuators, vision and rendering, robotics (e.g. for revalidation), (support for) independent living, social and welfare systems, banking, insurance, travel, real estate, rights management and many others.

Virtual worlds (often referred to as 3D3C for 3D visualization & navigation and the 3C's of Community, Creation and Commerce) integrate existing and emerging (media) technologies (e.g. instant messaging, video, 3D, VR, AI, chat, voice, etc.) that allow for the support of existing, and the development of new kinds of, social networks. The emergence of virtual worlds as platforms for social networking is recognized by businesses as an important issue for at least two reasons:

- It offers the power to reshape the way companies interact with their environments (markets, customers, suppliers, creators, stakeholders, etc.) in a fashion comparable to the Internet.
- It allows for the development of new (breakthrough) business models, services, applications and devices.

Each virtual world however has a different culture and audience making use of these specific worlds for a variety of reasons. These differences in existing metaverses permit users to have unique experiences. Resistance to real-world commercial encroachment still exists in many virtual worlds, where users primarily seek an escape from real life. Hence, marketers should get to know a virtual world beforehand and the rules that govern each individual universe.

Although realistic experiences have been achieved via devices such as 3-D audio/visual devices, it is hard to realize sensory effects only with the presentation of audiovisual contents. The addition of sensory effects leads to even more realistic experiences in the consumption of audiovisual contents. This will lead to the application of new media for enhanced experiences of users in a more realistic sense.

Such new media will benefit from the standardization of control and sensory information which can include sensory effect metadata, sensory device capabilities/commands, user sensory preferences, and various delivery formats. The MPEG-V architecture can be applicable for various business models for which audiovisual contents can be associated with sensory effects that need to be rendered on appropriate sensory devices.

This part of ISO/IEC 23005 contains the data types and tools which are common to more than one tool defined in more than one part of ISO/IEC 23005.

The International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this document may involve the use of patents.

ISO and the IEC take no position concerning the evidence, validity and scope of these patent rights.

The holders of these patent rights have assured ISO and the IEC that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of the holders of these patent rights are registered with ISO and the IEC. Information may be obtained from the companies listed in Annex C.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified in Annex C. ISO and the IEC shall not be held responsible for identifying any or all such patent rights.

Information technology — Media context and control —

Part 6: Common types and tools

1 Scope

This part of ISO/IEC 23005 specifies syntax and semantics of the data types and tools common to the tools defined in the other parts of ISO/IEC 23005, such as basic data types which are used as basic building blocks in more than one of the tools in ISO/IEC 23005, color-related basic types which are used in light and color-related tools to help in specifying color-related characteristics of the devices or commands, and time stamp types which can be used in device commands, and sensed information to specify timing related information.

Several classification schemes which are used in more than one part of ISO/IEC 23005 are also defined in Annex A of this part of ISO/IEC 23005. Other tools to be developed are included in this part of ISO/IEC 23005, if those tools are to be used with the tools defined in more than one part of ISO/IEC 23005. Most of the tools defined in this part are not intended to be used alone, but to be used as a part or as a supporting tool of other tools defined in other parts of ISO/IEC 23005.

2 Normative references

The following referenced documents are indispensable to the application of this document. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 15938-3, *Information technology — Multimedia content description interface — Part 3: Visual*

ISO/IEC 15938-5, *Information technology — Multimedia content description interface — Part 5: Multimedia description schemes*

ISO/IEC 23005-1, *Information technology — Media context and control — Part 1: Architecture*

3 Terms, definitions, and abbreviated terms

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

3.1 Terms and definitions

3.1.1

adaptation engine

adaptation RV and/or adaptation VR

3.1.2

adaptation RV

entity that takes the sensory effect metadata (3.1.13), the sensory device capabilities (3.1.10), the sensor capabilities (3.1.8), and/or the user's sensory preferences (3.1.15) as inputs and generates sensory device commands (3.1.11) and/or the sensed information (3.1.6) based on those and then takes the sensor capabilities (3.1.8) as inputs and the sensed information (3.1.6) from sensors and adapts the sensed information (3.1.16) based on the sensor capabilities (3.1.8)

EXAMPLE RoSE Engine.

3.1.3

adaptation VR

entity that can process the **sensory information** in order to be consumed within the real world's context

NOTE This can include the adaptation or transformation of the sensory information according to the capabilities of real world devices or the preferences of the user. A specification of these capabilities and preferences can be found in ISO/IEC 23005-2.

3.1.4

interaction device

device that accepts inputs from users and/or gives output to users in the form of various modalities

3.1.5

provider

entity that acts as the source of the **sensory effect metadata** (3.1.13)

EXAMPLE Broadcaster.

3.1.6

sensed information

information acquired by a sensor

3.1.7

sensor

consumer device by which user input or environmental information can be gathered

EXAMPLES Temperature sensor, distance sensor, motion sensor, etc.

3.1.8

sensor capability

description to represent the characteristics of **sensors** (3.1.7) in terms of the capability of the given **sensor** (3.1.7) such as accuracy, or sensing range

3.1.9

sensory device

consumer device by which the corresponding **sensory effect** (3.1.12) can be made

EXAMPLES Light, fan, heater, etc.

3.1.10

sensory device capability

description to represent the characteristics of **sensory devices** (3.1.9) in terms of the capability of the given sensory device

3.1.11

sensory device command

description to control **sensory devices** (3.1.9)

3.1.12**sensory effect**

effect to augment perception by stimulating human senses in a particular scene of a multimedia application

EXAMPLES Scent, wind, light, haptic [kinesthetic-force, stiffness, weight, friction, texture, widget (button, slider, joystick), tactile: air-jet, suction pressure, thermal, current, vibration, etc. Note that combinations of tactile display can also provide directional, shape information].

3.1.13**sensory effect metadata**

defines the description schemes and descriptors to represent **sensory effects** (3.1.12)

3.1.14**sensory information**

standardized representation format of ISO/IEC 23005 in the standardization area B as defined in ISO/IEC 23005-1

EXAMPLES Sensory effect metadata, haptic (kinesthetic/tactile) information, emotion information, avatar information.

3.1.15**user's sensory preferences**

description schemes and descriptors to represent user's preferences with respect to rendering of **sensory effects** (3.1.12)

3.2 Abbreviated terms

For the purposes of this document, the following abbreviations apply:

MPEG-21: ISO/IEC 21000

DIA: Digital Item Adaptation (see ISO/IEC 21000-7)

URI: Uniform Resource Identifier (IETF Standard is RFC 2396)

URL: Uniform Resource Locator (IETF Standard is RFC 2396)

XML: Extensible Markup Language (W3C, <http://www.w3.org/XML/>)

RoSE: Representation of Sensory Effects

4 Common Types**4.1 Introduction**

This Clause describes types common to more than one part of ISO/IEC 23005 including the schema wrapper conventions, basic data types, color related data types, and time stamp type. The types defined in this clause are defined to be used in combination with tools defined in other parts of ISO/IEC 23005, and are not intended to be instantiated by themselves.

4.2 Schema wrapper conventions

The Syntax defined in this Clause assumes the following Schema Wrapper to form a valid XML schema document.

```
<schema xmlns="http://www.w3.org/2001/XMLSchema"
xmlns:mpeg7="urn:mpeg:mpeg7:schema:2004" xmlns:mpegvct="urn:mpeg:mpeg-v:2010:01-
CT-NS" targetNamespace="urn:mpeg:mpeg-v:2010:01-CT-NS"
elementFormDefault="qualified" attributeFormDefault="unqualified"
version="ISO/IEC 23005-x" id="MPEG-V-CT.xsd">
  <import namespace="urn:mpeg:mpeg7:schema:2004"
schemaLocation="http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-
7_schema_files/mpeg7-v2.xsd"/>
```

Additionally, the following line should be appended to the resulting schema document in order to obtain a well-formed XML document.

```
</schema>
```

4.3 Basic datatypes

4.3.1 Introduction

This Clause describes structure of the basic datatypes which are commonly used in more than one part of ISO/IEC 23005 as a basic building block of the tools.

4.3.2 Syntax

```
<!-- ##### -->
<!-- Basic Datatypes -->
<!-- ##### -->
<!-- unit types -->
<simpleType name="unitType">
  <restriction base="mpeg7:termReferenceType"/>
</simpleType>
<!-- Inclination Degree Type -->
<simpleType name="InclineAngleType">
  <restriction base="integer">
    <minInclusive value="-360"/>
    <maxInclusive value="360"/>
  </restriction>
</simpleType>
<complexType name="Float3DVectorType">
  <sequence>
    <element name="X" type="float"/>
    <element name="Y" type="float"/>
    <element name="Z" type="float"/>
  </sequence>
</complexType>
```

4.3.3 Semantics

Semantics of the basic datatypes :

Name	Definition
unitType	Tool for describing a unit as a reference to a classification scheme term provided by UnitTypeCS defined in A.2.1. The details of the structure and use of classification scheme and termReferenceType description is defined in ISO/IEC 15938-5. EXAMPLE urn:mpeg:mpeg-v:01-CI-UnitTypeCS-NS:mps would describe the unit for speed in meter per second.
InclineAngleType	Describes the angle of inclination from -360 to 360 in degrees.
Float3DVectorType	Describes a set of vector including values for x, y, z, direction.
X	A Value that describes a float value(can be force, torque, position) for x-axis
Y	A Value that describes a float value(can be force, torque, position) for y-axis
Z	A Value that describes a float value(can be force, torque, position) for z-axis

4.4 Color-related Datatypes

4.4.1 Introduction

This Clause describes basic structure of the tools which are commonly used in more than one part of ISO/IEC 23005 to specify characteristics related to the light and/or color.

4.4.2 Syntax

```

<!-- ##### -->
<!-- Color Related Datatypes -->
<!-- ##### -->
<!-- colorType for Lighting Device type -->
<simpleType name="colorType">
  <union memberTypes="mpeg7:termReferenceType mpegvct:colorRGBType"/>
</simpleType>

<!-- colorRGB Type for Lighting Device type -->
<simpleType name="colorRGBType">
  <restriction base="NMTOKEN">
    <whiteSpace value="collapse"/>
    <pattern value="#[0-9A-Fa-f]{6}"/>
  </restriction>
</simpleType>

<complexType name="ToneReproductionCurvesType">
  <sequence maxOccurs="256">
    <element name="DAC_Value" type="mpeg7:unsigned8"/>
  </sequence>
</complexType>

```

```

        <element name="RGB_Value" type="mpeg7:doubleVector"/>
    </sequence>
</complexType>

<complexType name="ConversionLUTType">
    <sequence>
        <element name="RGB2XYZ_LUT" type="mpeg7:DoubleMatrixType"/>
        <element name="RGBScalar_Max" type="mpeg7:doubleVector"/>
        <element name="Offset_Value" type="mpeg7:doubleVector"/>
        <element name="Gain_Offset_Gamma" type="mpeg7:DoubleMatrixType"/>
        <element name="InverseLUT" type="mpeg7:DoubleMatrixType"/>
    </sequence>
</complexType>

<complexType name="IlluminantType">
    <choice>
        <sequence>
            <element name="xy_Value" type="mpegvct:ChromaticityType"/>
            <element name="Y_Value" type="mpeg7:unsigned7"/>
        </sequence>
        <element name="Correlated_CT" type="mpeg7:unsigned8"/>
    </choice>
</complexType>

<complexType name="InputDeviceColorGamutType">
    <sequence>
        <element name="IDCG_Type" type="string"/>
        <element name="IDCG_Value" type="mpeg7:DoubleMatrixType"/>
    </sequence>
</complexType>

<complexType name="ChromaticityType">
    <attribute name="x" type="mpeg7:zeroToOneType" use="required"/>
    <attribute name="y" type="mpeg7:zeroToOneType" use="required"/>
</complexType>

```

4.4.3 Semantics

Semantics of the basic datatypes:

Name	Definition
colorType	Describes the list of colors which the lighting device can provide as a reference to a classification scheme term or as RGB value. A CS that may be used for this purpose is the <code>ColorCS</code> defined in A.2.2. EXAMPLE <code>urn:mpeg:mpeg-v:01-SI-ColorCS-NS:alice_blue</code> would describe the color Alice blue.
colorRGBType	Tool for describing a color as RGB. EXAMPLE <code>#F0F8FF</code> would describe the color Alice blue.
ToneReproductionCurvesType	A type defining the schema of the Tone Reproduction Curves.
DAC_Value	An element describing discrete DAC values of input device.

Name	Definition
RGB_Value	An element describing normalized gamma curve values with respect to DAC values.
ConversionLUTType	A type of defining the schema of the conversion look-up table (matrix).
RGB2XYZ_LUT	This look-up table (matrix) converts an image from RGB to CIE XYZ. The size of the conversion matrix is 3x3 such as $\begin{bmatrix} R_x & G_x & B_x \\ R_y & G_y & B_y \\ R_z & G_z & B_z \end{bmatrix}.$
RGBScalar_Max	An element describing maximum RGB scalar values for GOG transformation. The order of describing the RGBScalar_Max is R_{max} , G_{max} , B_{max} .
Offset_Value	An element describing offset values of input display device when the DAC is 0. The value is described in CIE XYZ form. The order of describing the Offset_Value is X, Y, and Z.
Gain_Offset_Gamma	An element describing the gain, offset, gamma of RGB channels for GOG transformation. The size of the Gain_Offset_Gamma matrix is 3x3 such as $\begin{bmatrix} Gain_r & Gain_g & Gain_b \\ Offset_r & Offset_g & Offset_b \\ Gamma_r & Gamma_g & Gamma_b \end{bmatrix}.$
InverseLUT	This look-up table (matrix) converts an image from CIE XYZ to RGB. The size of the InverseLUT is 3x3 such as $\begin{bmatrix} R'_x & G'_x & B'_x \\ R'_y & G'_y & B'_y \\ R'_z & G'_z & B'_z \end{bmatrix}.$
IlluminantType	A type defining the schema of the white point setting (e.g. D65, D93) of the input display device.
xy_Value	An element describing the chromaticity of the light source.
Y_Value	An element describing the luminance of the light source between 0 and 100.
Correlated_CT	Indicates the correlated color temperature of the overall illumination. The value expression is obtained through quantizing the range [1667, 25000] into 28 bins in a non-uniform way as specified in ISO/IEC 15938-3.
InputDeviceColorGamutType	A type defining the schema of the Input device color gamut.
IDCG_Type	An element describing the type of input device color gamut (e.g., NTSC, SMPTE).

Name	Definition
IDCG_Value	An element describing the chromaticity values of RGB channels when the DAC values are maximum. The size of the IDCG_Value matrix is 3x2 such as $\begin{bmatrix} x_r & y_r \\ x_g & y_g \\ x_b & y_b \end{bmatrix}.$
ChromaticityType	Tool that describes the chromaticity.
X	Describes the x-value of chromaticity.
Y	Describes the y-value of chromaticity.

4.4.4 Additional validation rules

For the purpose of referencing the additional validation rules are numbered.

1. The number of RGB_value must be 3(red, green, and blue). Therefore the length of vector is fixed to 3.
2. The size of RGB2XYZ_LUT matrix shall be 3 by 3. Therefore the number of rows is fixed to 3 and the number of columns is fixed to 3.
3. The number of RGBScalar_Max must be 3(red, green, and blue). Therefore the length of RGBScalar_Max vector is fixed to 3.
4. The number of Offset_Value must be 3(red offset, green offset, blue offset). Therefore the length of Offset_Value vector is fixed to 3.
5. The size of Gain, Offset, and Gamma is 3, respectively. The size of matrix Gain_Offset_Gamma is 3 by 3. Therefore the number of rows is fixed to 3 and the number of columns is fixed to 3.
6. The size of Inverse_LUT matrix is 3 by 3. Therefore the number of rows is fixed to 3 and the number of columns is fixed to 3.
7. The size of IDCG_Value matrix is 3 by 2. Therefore the number of rows is fixed to 3 and the number of columns is fixed to 2.

4.5 Time stamp type

4.5.1 Introduction

This Clause describes the TimeStampType to specify the timing information for device commands and sensed information.

4.5.2 Syntax

```

<complexType name="TimeStampType" abstract="true"/>

<complexType name="AbsoluteTimeType">
  <complexContent>
    <extension base="mpegvct:TimeStampType">
      <attribute name="absTimeScheme" type="string" use="optional"/>
      <attribute name="absTime" type="string"/>
    </extension>
  </complexContent>
</complexType>

<complexType name="ClockTickTimeType">
  <complexContent>
    <extension base="mpegvct:TimeStampType">
      <attribute name="timeScale" type="unsignedInt" use="optional"/>
      <attribute name="pts" type="nonNegativeInteger"/>
    </extension>
  </complexContent>
</complexType>

<complexType name="ClockTickTimeDeltaType">
  <complexContent>
    <extension base="mpegvct:TimeStampType">
      <attribute name="timeScale" type="unsignedInt" use="optional"/>
      <attribute name="ptsDelta" type="unsignedInt"/>
    </extension>
  </complexContent>
</complexType>

```

4.5.3 Semantics

Semantics of the TimeStampType:

Name	Definition
TimeStampType	An abstract type providing root for three different tools, which are absoluteTimeType, ClockTickTimeType, and ClockTickTimeDeltaType, for specifying timing information for interaction devices to be synchronized with media or other devices.
AbsoluteTimeType	Defines the timing information in one of the absolute time schemes provided by other standards such as ISO/IEC 15938-5 (MPEG-7) or SMPTE by extending TimeStampType.
absTimeScheme	Specifies the absolute time scheme used in the format of string. See the annex C of ISO/IEC 21000-17:2006 for examples of time schemes syntax. If mpeg-7 time scheme is used, the value for this field shall be "mp7t".
absTime	Provides value of time information in the format defined in the absolute time scheme specified in absTimeScheme attribute.
ClockTickTimeType	Defines the timing information in terms of number of clock ticks from the origin of the target device.

<i>Name</i>	<i>Definition</i>
timescale	An optional attribute to provide the time scale for the clock tick, i.e. the number of clock ticks per second.
Pts	Specifies the number of clock ticks from the origin of the target device.
ClockTickTimeDeltaType	Defines the timing information in terms of relative time interval since the last timing information provided, in terms of clock ticks.
timescale	An optional attribute to provide the time scale for the clock tick, i.e. the number of clock ticks per second.
ptsDelta	Specifies the number of clock ticks from the time point specified by the last timing information provided.

Annex A (normative)

Classification Schemes

A.1 Introduction

This Annex specifies a set of classification schemes that may be used by applications using description tools specified in this part of ISO/IEC 23005. Applications need not use these classification schemes; they can use proprietary or third party ones. However, if they choose to use the classification schemes defined in this clause, no modifications or extensions are allowed to these classification schemes. The classification schemes in this clause are specified using the `ClassificationScheme` defined in ISO/IEC 15938-5. All of the classification schemes defined in this clause are uniquely identified by a URN following the "urn:mpeg:mpeg-v:01-CI-NameCS-NS" namespace identifier where Name should be replaced with the name of the classification scheme. For example, the URN "urn:mpeg:mpeg-v:01-CI-TactileDisplayCS-NS" identifies the classification scheme provided for `actuatorType` values of `TactileCapabilityType`.

In some cases there are several classification schemes associated with a single description. In such a case, any one of these classification schemes (as well as classification schemes not defined in this part of ISO/IEC 23005) may be used depending on the application domain.

A.2 Classification Schemes

A.2.1 UnitTypeCS

```
<ClassificationScheme uri="urn:mpeg:mpeg-v:01-CI-UnitTypeCS-NS">
  <Term termId="micrometer">
    <Name xml:lang="en">micrometer</Name>
    <Definition xml:lang="en">
      A unit of length or distance equal to one millionth of a meter
    </Definition>
  </Term>
  <Term termId="mm">
    <Name xml:lang="en">millimeter</Name>
    <Definition xml:lang="en">
      A unit of length or distance equal to one thousandth of a meter
    </Definition>
  </Term>
  <Term termId="cm">
    <Name xml:lang="en">centimeter</Name>
    <Definition xml:lang="en">
      A unit of length or distance equal to one hundredth of a meter
    </Definition>
  </Term>
  <Term termId="meter">
    <Name xml:lang="en">meter</Name>
    <Definition xml:lang="en">
      The basic unit of length in International System of Units
    </Definition>
  </Term>
  <Term termId="km">
```

```

<Name xml:lang="en">kilometer</Name>
<Definition xml:lang="en">
  A unit of length or distance equal to one thousand meter
</Definition>
</Term>
<Term termId="inch">
  <Name xml:lang="en">inch</Name>
  <Definition xml:lang="en">
    A unit of length or distance equal to 0.0254 meter
  </Definition>
</Term>
<Term termId="yard">
  <Name xml:lang="en">yard</Name>
  <Definition xml:lang="en">
    A unit of length or distance equal to 0.9144 meter
  </Definition>
</Term>
<Term termId="mile">
  <Name xml:lang="en">mile</Name>
  <Definition xml:lang="en">
    A unit of length or distance equal to 1609.344 meter
  </Definition>
</Term>
<Term termId="mg">
  <Name xml:lang="en">milligram</Name>
  <Definition xml:lang="en">
    A unit of mass or weight equal to one millionth of a kilogram
  </Definition>
</Term>
<Term termId="gram">
  <Name xml:lang="en">gram</Name>
  <Definition xml:lang="en">
    A unit of mass or weight equal to one thousandth of a kilogram
  </Definition>
</Term>
<Term termId="kg">
  <Name xml:lang="en">kilogram</Name>
  <Definition xml:lang="en">
    The base unit of mass in International System of Units
  </Definition>
</Term>
<Term termId="ton">
  <Name xml:lang="en">ton</Name>
  <Definition xml:lang="en">
    A unit of mass or weight equal to a thousand kilogram
  </Definition>
</Term>
<Term termId="micrometerpersec">
  <Name xml:lang="en">micrometerpersec</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to a millionth of a meterpersecond
  </Definition>
</Term>
<Term termId="mmpersec">
  <Name xml:lang="en">millimeterpersecond</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to a thousandth of a meterpersecond
  </Definition>
</Term>
<Term termId="cmpersec">

```

```

<Name xml:lang="en">centimeterpersecond</Name>
<Definition xml:lang="en">
  A unit of velocity equal to a hundredth of a meterpersecond
</Definition>
</Term>
<Term termId="meterpersec">
  <Name xml:lang="en">meterpersecond</Name>
  <Definition xml:lang="en">
    The SI coherent derived unit of velocity in International System of Units
  </Definition>
</Term>
<Term termId="kmpersec">
  <Name xml:lang="en">kilometerpersecond</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to a thousand meterpersecond
  </Definition>
</Term>
<Term termId="inchpersec">
  <Name xml:lang="en">inchpersecond</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to 0.0254 meterpersecond
  </Definition>
</Term>
<Term termId="yardpersec">
  <Name xml:lang="en">yardpersecond</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to 0.9144 meterpersecond
  </Definition>
</Term>
<Term termId="milepersec">
  <Name xml:lang="en">milepersecond</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to 1609.344 meterpersecond
  </Definition>
</Term>
<Term termId="micrometerpermin">
  <Name xml:lang="en">micrometerperminute</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to a millionth of a meterperminute
  </Definition>
</Term>
<Term termId="mmpermin">
  <Name xml:lang="en">millimeterperminute</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to a thousandth of a meterperminute
  </Definition>
</Term>
<Term termId="cmpermin">
  <Name xml:lang="en">centimeterperminute</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to a hundredth of a meterperminute
  </Definition>
</Term>
<Term termId="meterpermin">
  <Name xml:lang="en">meterperminute</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to one sixtyth of a meterpersecond
  </Definition>
</Term>
<Term termId="kmpermin">

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<Name xml:lang="en">kilometerperminute</Name>
<Definition xml:lang="en">
  A unit of velocity equal to a thousand meterperminute
</Definition>
</Term>
<Term termId="inchpermin">
  <Name xml:lang="en">inchperminute</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to 0.0254 meterperminute
  </Definition>
</Term>
<Term termId="yardpermin">
  <Name xml:lang="en">yardperminute</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to 0.9144 meterperminute
  </Definition>
</Term>
<Term termId="milepermin">
  <Name xml:lang="en">mileperminute</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to 1609.344 meterperminute
  </Definition>
</Term>
<Term termId="micrometerperhour">
  <Name xml:lang="en">micrometerperhour</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to a millionth of a meterperhour
  </Definition>
</Term>
<Term termId="mmperhour">
  <Name xml:lang="en">millimeterperhour</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to a thousandth of a meterperhour
  </Definition>
</Term>
<Term termId="cmperhour">
  <Name xml:lang="en">centimeterperhour</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to a hundredth of a meterperhour
  </Definition>
</Term>
<Term termId="meterperhour">
  <Name xml:lang="en">meterperhour</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to one over thirty-six hundred of a
meterpersecond
  </Definition>
</Term>
<Term termId="kmperhour">
  <Name xml:lang="en">kilometerperhour</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to a thousand meterperhour
  </Definition>
</Term>
<Term termId="inchperhour">
  <Name xml:lang="en">inchperhour</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to 0.0254 meterperhour
  </Definition>
</Term>

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<Term termId="yardperhour">
  <Name xml:lang="en">yardperhour</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to 0.9144 meterperhour
  </Definition>
</Term>
<Term termId="mileperhour">
  <Name xml:lang="en">mileperhour</Name>
  <Definition xml:lang="en">
    A unit of velocity equal to 1609.344 meterperhour
  </Definition>
</Term>

<Term termId="micrometerpersecsquared">
  <Name xml:lang="en">micrometerpersecsquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to a millionth of a meterpersecondsquared
  </Definition>
</Term>
<Term termId="mmpersecsquared">
  <Name xml:lang="en">millimeterpersecondsquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to a thousandth of a meterpersecondsquared
  </Definition>
</Term>
<Term termId="cmpersecsquared">
  <Name xml:lang="en">centimeterpersecondsquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to a hundredth of a meterpersecondsquared
  </Definition>
</Term>
<Term termId="meterpersecsquared">
  <Name xml:lang="en">meterpersecondsquared</Name>
  <Definition xml:lang="en">
    The SI coherent derived unit of acceleration in International System of
Units
  </Definition>
</Term>
<Term termId="kmpersecsquared">
  <Name xml:lang="en">kilometerpersecondsquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to a thousand meterpersecondsquared
  </Definition>
</Term>
<Term termId="inchpersecsquared">
  <Name xml:lang="en">inchpersecondsquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to 0.0254 meterpersecondsquared
  </Definition>
</Term>
<Term termId="yardpersecsquared">
  <Name xml:lang="en">yardpersecondsquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to 0.9144 meterpersecondsquared
  </Definition>
</Term>
<Term termId="milepersecsquared">
  <Name xml:lang="en">milepersecondsquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to 1609.344 meterpersecondsquared
  </Definition>
</Term>

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    </Definition>
</Term>
<Term termId="micrometerperminsquared">
  <Name xml:lang="en">micrometerperminutesquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to a millionth of a meterperminsquared
  </Definition>
</Term>
<Term termId="mmperminsquared">
  <Name xml:lang="en">millimeterperminutesquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to a thousandth of a meterperminsquared
  </Definition>
</Term>
<Term termId="cmperminsquared">
  <Name xml:lang="en">centimeterperminutesquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to a hundredth of a meterperminsquared
  </Definition>
</Term>
<Term termId="meterperminsquared">
  <Name xml:lang="en">meterperminutesquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to one over thirty-six hundred of a
meterpersecondsquared
  </Definition>
</Term>
<Term termId="kmperminsquared">
  <Name xml:lang="en">kilometerperminutesquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to a thousand meterperminsquared
  </Definition>
</Term>
<Term termId="inchperminsquared">
  <Name xml:lang="en">inchperminutesquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to 0.0254 meterperminsquared
  </Definition>
</Term>
<Term termId="yardperminsquared">
  <Name xml:lang="en">yardperminutesquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to 0.9144 meterperminsquared
  </Definition>
</Term>
<Term termId="mileperminsquared">
  <Name xml:lang="en">mileperminutesquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to 1609.344 meterperminsquared
  </Definition>
</Term>
<Term termId="micrometerperhoursquared">
  <Name xml:lang="en">micrometerperhoursquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to a millionth of a meterperhoursquared
  </Definition>
</Term>
<Term termId="mmperhoursquared">
  <Name xml:lang="en">millimeterperhoursquared</Name>
  <Definition xml:lang="en">

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    A unit of acceleration equal to a thousandth of a meterperhoursquared
  </Definition>
</Term>
<Term termId="cmperhoursquared">
  <Name xml:lang="en">centimeterperhoursquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to a hundredth of a meterperhoursquared
  </Definition>
</Term>
<Term termId="meterperhoursquared">
  <Name xml:lang="en">meterperhoursquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to one over twelve million ninty-six hundred
    thousand of a meterpersecondsquared
  </Definition>
</Term>
<Term termId="kmperhoursquared">
  <Name xml:lang="en">kilometerperhoursquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to a thousand meterperhoursquared
  </Definition>
</Term>
<Term termId="inchperhoursquared">
  <Name xml:lang="en">inchperhoursquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to 0.0254 meterperhoursquared
  </Definition>
</Term>
<Term termId="yardperhoursquared">
  <Name xml:lang="en">yardperhoursquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to 0.9144 meterperhoursquared
  </Definition>
</Term>
<Term termId="mileperhoursquared">
  <Name xml:lang="en">mileperhoursquared</Name>
  <Definition xml:lang="en">
    A unit of acceleration equal to 1609.344 meterperhoursquared
  </Definition>
</Term>
<Term termId="Newton">
  <Name xml:lang="en">Newton</Name>
  <Definition xml:lang="en">
    The SI coherent derived unit of force in International System of Units,
    which is equal to one kilogram-meter per second squared
  </Definition>
</Term>
<Term termId="Nmm">
  <Name xml:lang="en">Newtonmillimeter</Name>
  <Definition xml:lang="en">
    The derived unit of energy, work, and quantity of heat in International
    System of Units, which is equal to a thousandth of one kilogram-square meter per
    second squared
  </Definition>
</Term>
<Term termId="Npmm">
  <Name xml:lang="en">Newtonpermillimeter</Name>
  <Definition xml:lang="en">
    The derived unit of surface tension in International System of Units,
    which is equal to a thousandth of one kilogram per second squared

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