

## Proposal for units of measure

*Rationale:* At present, the standard uses several different units for measuring length:

- half a point (Fonts see ST\_HPSMeasure Part 4/2.18.48/p. 1742, ST\_SignedHPSMeasure Part 4/2.18.87/p. 1809),
- EMU (English Metric Unit) (DrawingML see ST\_Coordinate data type Part 4/5.1.12.16/p. 3694)
- 100th of point (Fonts see ST\_TextPoint data type Part 4/5.1.12.75/p. 3861)
- twentieth of a point (Tables, frames, images see ST\_TwipsMeasure Part 4/2.18.105/p. 1836, ST\_SignedTwipsMeasure Part 4/2.18.88/p. 1809)
- eighth of a point (WordProcessingML Border Width, see ST\_EighthPointMeasure Part 4/2.18.27/p. 1718)

At the same time there are attributes that already have a possibility of defined units, for instance `strokeWeight` (see Shape Stroke Weight, Part 4/6.1.2.13/p. 4534).

This is very inconvenient if you are writing code to emit OOXML—developer has to make all conversions from common units to those units used internally by OOXML and he/she has to remember which unit to use in different contexts.

The ECMA response to FI-0010 and CZ-0045 already suggested two possible ways to add units to measures:

1. `<w:sz w:unit="points" w:val="32" />`
2. `<w:sz w:val="32pt" />`

but concluded that this should be done in a future version as both approaches are seen to have merits and disadvantages.

We think that we fully understand the reasons for units currently used in the DIS29500. However, when used they do not add to the sustainability of the standard. Therefore we propose that approach to units should be changed in the first version of the standard.

The aim of this proposal is to allow usage of a few selected and widely used units of measure as an alternative to existing units. Conforming application should not be requested to preserve units of measure between loading and saving document.

Compare current fragment of OOXML

```
<w:p>
  <w:r>
    <w:rPr>
      <w:sz w:val="48"/>
    </w:rPr>
    <w:t>BRM</w:t>
  </w:r>
</w:p>
<w:sectPr>
  <w:pgSz w:w="11906" w:h="16838"/>
  ...
</w:sectPr>
```

with the following more readable code which will be allowed if the proposed change is accepted.

```
<w:p>
  <w:r>
    <w:rPr>
      <w:sz w:val="24pt"/>
    </w:rPr>
    <w:t>BRM</w:t>
  </w:r>
</w:p>
<w:sectPr>
  <w:pgSz w:w="210mm" w:h="297mm"/>
  ...
</w:sectPr>
```

The same set of units as defined in ISO/IEC 10179 (DSSSL) should be supported – namely cm, mm, in, pt, pc. These are already supported in the user interface of office applications for quite a many elements that are stored in non-standard units.

The proposed change could be implemented by doing the following edits to DIS29500 text. The yellow highlighting is used to emphasise text that has to be modified (added/deleted).

### 1.1.1 ST\_HpsMeasure (Measurement in Half-Points)

This simple type specifies that its contents will contain either:

- a positive whole number, whose contents consist of a measurement in half-points (equivalent to 1/144th of an inch), or
- a positive decimal number immediately followed by a unit identifier.

The contents of this measurement are interpreted based on the context of the parent XML element.

[Example: Consider an attribute value of 72 whose type is ST\_HpsMeasure. This attribute value specifies a size of one-half of an inch or 36 points (72 halves of a point = 36 points = 0.5 inches). end example]

[Example: Consider an attribute value of 12.7mm whose type is ST\_HpsMeasure. This attribute value specifies a size of 0.0127 meter or one-half of an inch or 36 points. end example]

This simple type's contents is union of are a restriction of the ST\_UnsignedDecimalNumber simple type (§) and the ST\_UniversalMeasure simple type.

#### Referenced By

hps@val (§); hpsBaseText@val (§); hpsRaise@val (§); kern@val (§); size@val (§); sz@val (§); szCs@val (§)

The following XML Schema fragment defines the contents of this simple type:

```

<simpleType name="ST_HpsMeasure">
  <union memberTypes="ST_UnsignedDecimalNumber ST_UniversalMeasure"/>
</simpleType>
<simpleType name="ST_HpsMeasure">
  <restriction base="ST_UnsignedDecimalNumber"/>
</simpleType>

```

The analogical change will be made also to the definition of the following data types:

- *ST\_SignedHPSMeasure*
- *ST\_Coordinate*
- *ST\_Coordinate32*
- *ST\_TextPoint*
- *ST\_TwipsMeasure*
- *ST\_SignedTwipsMeasure*

### 1.1.2ST\_UniversalMeasure

This simple type specifies that its contents will contain measurement expressed using one of common measure units. The content of this type is a decimal number immediately followed by a unit identifier. Unit identifiers are case sensitive and shall be in lowercase. The following table lists units of measure which are allowed together with their definition based on existing standard or expressed as a conversion from other unit of measure.

Unit identifier	Definition
cm	As defined in ISO31.
mm	As defined in ISO31.
in	1in = 2.54cm
pt	1pt = 1/72in
pc	1pc = 12pt
pi	1pi = 12pt

The following XML Schema fragment defines the contents of this simple type:

```

<simpleType name="ST_UniversalMeasure">
  <restriction base="string">
    <pattern value="[0-9]+(\\.[0-9]+)?(mm|cm|in|pt|pc|pi)"/>
  </restriction>
</simpleType>

```

There are two identifiers for pica (pc and pi) as the former is well established in several W3C recommendations and the later is used in user interface of office applications.