[MS-ISO10646]:
Microsoft Universal Multiple-Octet Coded Character Set (UCS) Standards Support Document

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Revision Summary

Date	Revision History	Revision Class	Comments
03/26/2010	1.0	New	Released new document.
05/26/2010	1.2	None	Introduced no new technical or language changes.
09/08/2010	1.3	Major	Significantly changed the technical content.
02/10/2011	2.0	No change	Introduced no new technical or language changes.
02/22/2012	3.0	Major	Significantly changed the technical content.
07/25/2012	3.1	Minor	Clarified the meaning of the technical content.

Table of Contents

1 Introduction

This document describes the level of support provided by Windows® Internet Explorer® for *the ISO/IEC 10646:2003 Information technology -- Universal Multiple-Octet Coded Character Set (UCS)* [ISO-10646] published on December 2003. Internet Explorer displays webpages written in HTML.

The [ISO-10646] specification may contain guidance for authors of webpages and browser users, in addition to user agents (browser applications). Statements found in this document apply only to normative requirements in the specification targeted to user agents, not those targeted to authors.

1.1 Glossary

MAY, SHOULD, MUST, SHOULD NOT, MUST NOT: These terms (in all caps) are used as described in [RFC2119]. All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

1.2 References

References to Microsoft Open Specifications documentation do not include a publishing year because links are to the latest version of the technical documents, which are updated frequently. References to other documents include a publishing year when one is available.

1.2.1 Normative References

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact dochelp@microsoft.com. We will assist you in finding the relevant information. Please check the archive site, http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624, as an additional source.

[ISO-10646] International Organization for Standardization, "Information Technology - Universal Multiple-Octet Coded Character Set (UCS)", ISO/IEC 10646:2003, December 2003, http://www.iso.ch/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=39921&ICS1

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, http://www.rfc-editor.org/rfc/rfc2119.txt

1.2.2 Informative References

None.

1.3 Microsoft Implementations

The following Microsoft products implement some portion of [ISO-10646]:

- Windows® Internet Explorer® 7
- Windows® Internet Explorer® 8
- Windows® Internet Explorer® 9
- Windows® Internet Explorer® 10

In addition, each version of Windows® Internet Explorer® implements multiple document modes, which can vary individually in their support of the standard. The following table lists the document modes available in each version of Internet Explorer:

Browser Version	Documents Modes Supported
Internet Explorer 7	Quirks Mode Standards Mode
Internet Explorer 8	Quirks Mode IE7 Mode IE8 Mode
Internet Explorer 9	Quirks mode IE7 mode IE8 mode IE9 mode
Internet Explorer 10	Quirks mode IE7 mode IE8 mode IE9 mode IE10 Mode

Throughout this document, the document mode appears first followed by the browser version in parentheses. Only those document modes and versions of Internet Explorer for which there is a variation note will be listed. If the document mode is not listed, conformance to the specification can be assumed.

Note "Standards mode" in Internet Explorer 7 and "IE7 Mode" in Internet Explorer 8 refer to the same document mode. **IE7 mode** is the preferred way of referring to this document mode across all versions of the browser.

1.4 Standards Support Requirements

To conform to [ISO-10646], a user agent must implement all required portions of the specification. Any optional portions that have been implemented must also be implemented as described by the specification. Normative language is usually used to define both required and optional portions. (For more information, see [RFC2119].)

The following table lists the sections of [ISO-10646] and whether they are considered normative or informative.

Sections	Normative/Informative
1-6	Informative
7-33	Normative
Annexes A-D	Normative
Annexes F-U	Informative

1.5 Notation

The following notations are used in this document to differentiate between notes of clarification, variation from the specification, and points of extensibility.

Notation	Explanation
C####	This identifies a clarification of ambiguity in the target specification. This includes imprecise statements, omitted information, discrepancies, and errata. This does not include data formatting clarifications.
V####	This identifies an intended point of variability in the target specification such as the use of MAY, SHOULD, or RECOMMENDED. (See [RFC2119].) This does not include extensibility points.
E####	Because the use of extensibility points (such as optional implementation-specific data) can impair interoperability, this profile identifies such points in the target specification.

For document mode and browser version notation, see also section 1.3.

2 Standards Support Statements

This section contains a full list of variations, clarifications, and extension points in the Microsoft implementation of [ISO-10646].

- Section 2.1 includes only those variations that violate a MUST requirement in the target specification.
- Section 2.2 describes further variations from MAY and SHOULD requirements.
- Section 2.3 identifies variations in error handling.
- Section 2.4 identifies variations that impact security.

2.1 Normative Variations

The following subsections detail the normative variations from MUST requirements in [ISO-10646].

2.1.1 [ISO10646] Section 19, Mirrored Characters in a Bidirectional Context

V0001:

The specification states:

```
This character mirroring is not limited to paired characters and shall be applied
to all characters belonging to that class.
```

All Document Modes (All Versions)

Characters for which [ISO-10646] represents the mirrored glyph as a separate code point are mirrored. For characters with no code point for the mirrored glyph, no mirroring is performed. For example, because the character 0028 LEFT PARENTHESIS has the mirrored glyph at code point 0029 RIGHT PARENTHESIS, it is mirrored.

2.1.2 [ISO10646] Section B.1, List of all combining characters

V0002:

The specification contains a list of combining characters that spans several amendments.

All Document Modes (All Versions)

Combining characters in the following ranges are not recognized.

Core Specification

- 0D82-0D83
- 1712-1773 (TAGALOG, HANUNOO, BUHID, TAGBANWA)
- 1920-193B (LIMBU)
- 1D165-1D1AD (MUSICAL)

Amendment 1

- 19B0-19C9 (NEW TAI LUE)
- 1A17-1A1B (BUGINESE)
- A802-A827 (SYLOTI)
- 10A01-10A3A (KHAROSHTHI)
- 1D242-1D244 (GREEK MUSICAL)

Amendment 2

- 07EB-07F3 (NKO)
- 1B00-1B73 (BALINESE)

Amendment 3

- 1B80-1BAA (SUDANESE)
- 1C24-1C37 (LEPCHA)
- A880-A8C4 (SAURASHTRA)
- A926-A92D (KAYAH)
- A947-A953 (REJANG)
- 101FD (PHAISTOS)

Amendment 4

- 0616-061A (ARABIC)
- 1067-108F (MYANMAR)
- A66F-A67D (CYRILLIC)
- AA29-AA4D (CHAM)

The entirety of amendment 5 is not supported.

2.1.3 [ISO10646] Section D.4, Mapping from UCS-4 form to UTF-8 form

V0003:

The specification states:

```
Table D.4 defines in mathematical notation the mapping from the UCS-4 coded
representation form to the UTF-8 coded representation form.
```

All Document Modes (All Versions)

Characters encoded as UTF-8 that have values beyond the range of what can be represented by UTF-16 (up to `0x10FFFF`) have each byte decoded as a separate character.

2.2 Clarifications

The following subsections identify clarifications to recommendations made by [ISO-10646].

2.2.1 [ISO10646] Section 14, Implementation Levels

C0001:

The specification states:

```
ISO/IEC 10646 specifies three levels of implementation. Combining characters are
described in clause 25 and listed in annex B.

14.1 Implementation level 1
When implementation level 1 is used, a CC-dataelement shall not contain coded
representations of combining characters (see clause B.1) nor of characters from the
HANGUL JAMO block (see clause 26.1). When implementation level 1 is used the
uniquespelling rule shall apply (see clause 26.2).

14.2 Implementation level 2
When implementation level 2 is used, a CC-dataelement shall not contain coded
representations of characters listed in clause B.2. When implementation level 2 is
used the unique-spelling rule shall apply (see clause 26.2).

14.3 Implementation level 3
When implementation level 3 is used, a CC-dataelement may contain coded
representations of any characters.
```

All Document Modes (All Versions)

Coded representations of characters not allowed in implementation levels 1 or 2 (for example, `0x0483`) are displayed. Therefore, Windows® Internet Explorer® is considered to be at implementation level 3.

2.2.2 [ISO10646] Section C.6, Unpaired RC-elements: Interpretation by receiving devices

C0002:

The specification states:

```
According to clause C.1 an unpaired RC-element (see clause 4.34) is not in
conformance with the requirements of UTF-16. If a receiving device that has adopted
the UTF-16 form receives an unpaired RC-element because of error conditions either:
* in an originating device, or
* in the interchange between an originating and the receiving device, or
* in the receiving device itself,
then it shall interpret that unpaired RC-element in the same way that it interprets
a character that is outside the adopted subset that has been identified for the
device (see sub-clause 2.3c).
```

All Document Modes (All Versions)

Unpaired RC elements are replaced with the character `0xFFFD`.

2.2.3 [ISO10646] Section D.7, Incorrect sequences of octets: Interpretationby receiving devices

C0003:

The specification states:

```
According to D.2 an octet in the range 00 to 7F or C0 to FB is the first octet of a
UTF-8 sequence, and is followed by the appropriate number (from 0 to 5) of
continuing octets in the range 80 to BF. Furthermore, octets whose value is FE or
FF are not used; thus they are invalid in UTF-8.

If a CC-data-element includes either:
* a first octet that is not immediately followed by the correct number of
continuing octets, or
* one or more continuing octets that are not required to complete a sequence of
first and continuing octets, or
* an invalid octet,
then according to D.2 such a sequence of octets is not in conformance with the
requirements of UTF-8. It is known as a malformed sequence. If a receiving device
that has adopted the UTF-8 form
receives a malformed sequence, because of error conditions either:
* in an originating device, or
* in the interchange between an originating and a receiving device, or
* in the receiving device itself,
then it shall interpret that malformed sequence in the same way that it interprets
a character that is outside the adopted subset that has been identified for the
device (see sub-clause 2.3c).
```

All Document Modes (All Versions)

Incorrect octets are replaced with the character `0xFFFD`.

2.3 Error Handling

There are no additional considerations for error handling.

2.4 Security

There are no additional security considerations.

3 Change Tracking

This section identifies changes that were made to the [MS-ISO10646] protocol document between the February 2012 and July 2012 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

The revision class **New** means that a new document is being released.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements or functionality.
- An extensive rewrite, addition, or deletion of major portions of content.
- The removal of a document from the documentation set.
- Changes made for template compliance.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **Editorial** means that the language and formatting in the technical content was changed. Editorial changes apply to grammatical, formatting, and style issues.

The revision class **No change** means that no new technical or language changes were introduced. The technical content of the document is identical to the last released version, but minor editorial and formatting changes, as well as updates to the header and footer information, and to the revision summary, may have been made.

Major and minor changes can be described further using the following change types:

- New content added.
- Content updated.
- Content removed.
- New product behavior note added.
- Product behavior note updated.
- Product behavior note removed.
- New protocol syntax added.
- Protocol syntax updated.
- Protocol syntax removed.
- New content added due to protocol revision.
- Content updated due to protocol revision.
- Content removed due to protocol revision.
- New protocol syntax added due to protocol revision.

- Protocol syntax updated due to protocol revision.
- Protocol syntax removed due to protocol revision.
- New content added for template compliance.
- Content updated for template compliance.
- Content removed for template compliance.
- Obsolete document removed.

Editorial changes are always classified with the change type **Editorially updated.**

Some important terms used in the change type descriptions are defined as follows:

- **Protocol syntax** refers to data elements (such as packets, structures, enumerations, and methods) as well as interfaces.
- **Protocol revision** refers to changes made to a protocol that affect the bits that are sent over the wire.

The changes made to this document are listed in the following table. For more information, please contact protocol@microsoft.com.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
1 Introduction	Updated document to remove beta tagging.	N	Content updated.
1.3 Microsoft Implementations	Added Internet Explorer 10 (Beta) to the product list.	N	Content updated.

4 Index