



BSI Standards Publication

Information technology — Keyboard layouts for text and office systems

Part 9: Multi-lingual, multiscript keyboard layouts

National foreword

This British Standard is the UK implementation of ISO/IEC 9995-9:2016+A1:2019. It supersedes BS ISO/IEC 9995-9:2016, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to ISO/IEC text carry the number of the ISO/IEC amendment. For example, text altered by ISO/IEC amendment 1 is indicated by **A1** **A1**.

The UK participation in its preparation was entrusted to Technical Committee ICT/2, ICT Accessibility.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2019
Published by BSI Standards Limited 2019

ISBN 978 0 539 01138 8

ICS 35.180

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 October 2016.

Amendments/corrigenda issued since publication

Date	Text affected
31 October 2019	Implementation of ISO/IEC amendment 1:2019

First edition
2016-10-01

AMENDMENT 1
2019-09

Information technology — Keyboard layouts for text and office systems —

Part 9: Multi-lingual, multiscript keyboard layouts

Technologies de l'information — Disposition des claviers conçus pour la bureautique —

Partie 9: Dispositions de claviers multilingues et multi-écritures



Reference number
ISO/IEC 9995-9:2016(E)

AVA Documents
Document Sharing Hub
© ISO/IEC 2016



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, 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
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword	iv
1 Scope	1
2 Conformance	1
3 Normative references	2
4 Terms and definitions	2
5 Groups and modes	5
5.1 General	5
5.2 Groups denoted by single Latin letters.....	5
5.3 Other groups	7
6 Special keys	9
6.1 Use of the Backspace key	9
6.2 Recommended allocation of the Superselect function	10
6.3 The Secondary Superselect function	10
6.3.1 Secondary superselect function definition.....	10
6.3.2 Recommended allocation	11
7 The special modes "Unicode decimal" and Unicode hexadecimal"	11
8 The special mode "IPA"	12
9 References to characters not contained in ISO/IEC 10646:2012	14
Annex A (informative) General information	16
Annex B (normative) Group definition tables	25
Annex C (normative) Table for special mode "IPA"	49
Annex D (informative) Summary of ISO/IEC 10646 characters	51
Annex E (informative) List of enterable ISO/IEC 10646 characters	55

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.

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 document 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC 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).

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 35, *User interfaces*.

ISO/IEC 9995 consists of the following parts, under the general title *Information technology — Keyboard layouts for text and office systems*:

- *Part 1: General principles governing keyboard layouts*
- *Part 2: Alphanumeric section*
- *Part 3: Complementary layouts of the alphanumeric zone of the alphanumeric section*
- *Part 4: Numeric section*
- *Part 5: Editing and function section*
- *Part 7: Symbols used to represent functions*
- *Part 8: Allocation of letters to the keys of a numeric keypad*
- *Part 9: Multilingual, multiscript keyboard layouts*
- *Part 10: Conventional symbols and methods to represent graphic characters not uniquely recognizable by their glyph on a keyboard and in documentation*
- *Part 11: Functionality of dead keys and repertoires of characters entered by dead keys*

Information technology — Keyboard layouts for office systems — Part 9: Multi-lingual, multiscript keyboard layouts

1 Scope

Within the general scope described in ISO/IEC 9995-1, this part of ISO 9995 defines the allocation on a keyboard of a set of graphic characters which, when used in combination with an existing national version keyboard layout, allows the input of a minimum character repertoire as defined herein.

This repertoire is intended to address all characters needed to write all contemporary languages using the Latin script, together with standardized Latin transliterations of some major languages using other scripts. It also contains all symbols and punctuation marks contained in ISO 8859-1, together with some selected other ones commonly used in typography and office use.

It also addresses characters of some other scripts (Greek, Cyrillic, Armenian, Georgian, Hebrew) to the same extent (in the case of Cyrillic, leaving out some minority languages of the Russian Federation which have only a few hundred speakers left). It provides means to include other scripts (e.g. Arabic, Devanagari) in future versions of this part of ISO 9995 (e.g. by amendments).

Furthermore, it addresses the International Phonetic Alphabet (IPA).

This part of ISO 9995 is primarily intended for word-processing and text-processing applications, to be used with full-sized keyboards as well as with miniature keyboards found on mobile devices ("smartphones" or handheld computers), especially ones which have only keys for the 26 basic Latin letters but no dedicated keys for digits.

2 Conformance

The layout of a keyboard conforms to this part of ISO 9995 if it meets all of the following conditions:

- It is either a Latin keyboard, or a Latin-conformant keyboard, as defined in Clause 3.
- It is either a compact keyboard, or a full keyboard, as defined in Clause 3.
- There is a special function called "Superselect", which, when (according to the layout) either operated (i.e. pressed if it is a key) together with any A to Z key, or followed by the actuation of any A to Z key, performs the function according to Tables 1 and 2 in Clause 5.

NOTE 1 The "Superselect" can be a single dedicated key, or a special sequence of other keys to be input.

EXAMPLE The "Superselect" can be a "symbol key" to be pressed together with a "shift key".

Furthermore, the software driving the keyboard shall fulfil the following requirements to make the keyboard conform to this part of ISO 9995:

- The keyboard is intended to output valid ISO/IEC 10646 characters and valid sequences thereof.
- Any of the groups contained in Tables 1 and 2 in Clause 5 and specified in the subsequent text are contained in the layout, unless they are marked as optional in these tables. The groups may contain

additional characters associated with other keys than in the tables as long as any listed pairing of D-Groups and L-Groups is unaffected.

NOTE 2 It is not specified in this part of 9995 which characters or symbols are in fact to be engraved on the keyboard.

Any statement of conformance to this part of ISO 9995 shall be taken to imply that the complete character repertoire of the IPA table in Annex C and of all groups listed in Clause 5 has been implemented, with the exception that group YY (compatibility characters and symbols), which may be implemented only partially or not at all.

Such statements of conformance may be made for fonts. If such a statement of conformance for a font is made in connection with one or more of the terms: "Latin", "Greek", "Cyrillic", "Armenian", "Georgian", "Hebrew", "Arabic", "Korean", "IPA", this shall be taken to imply that the character repertoire(s) listed in Annex D under the correspondingly named headers D.2.2 to D.2.10 has/have to be supplied by the font, and, as long as any of the listed terms except "IPA" is applied, this shall be taken to imply that also the character repertoire listed there under D.2.1 "Digits, punctuation and symbols" has to be supplied by the font. In no case is there an implication whether the character repertoire listed under D.2.1 "Compatibility characters and symbols" is supplied completely, partially or not at all by the font.

3 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 646:1991, *Information technology — ISO 7-bit coded character set for information interchange*

ISO/IEC 9995-1:2009, *Information technology — Keyboard layouts for text and office systems — Part 1: General principles governing keyboard layouts*

ISO/IEC 9995-3:2010, *Information technology — Keyboard layouts for text and office systems — Part 3: Complementary layouts of the alphanumeric zone of the alphanumeric section*

ISO/IEC 10646: 2014, *Information technology — Universal Coded Character Set (UCS)*

IPA: Handbook of the International Phonetic Association. Cambridge 1999 (reprinted 2003). ISBN 0 521 63751 1: Appendix 2: Computer coding of IPA symbols (pp. 161-185)

4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 9995-1 and the following apply.

4.1

actuate a character

select a character by selecting the appropriate group and level (if necessary) and pressing the key itself

4.2

associated with <key>

key used to enter a character or to call a function

Note 1 to entry: Any group and/or level selection prerequisite for this action must be done for the key actuation to enter the intended character or call the intended function.

4.3

A to Z key

key associated with any Latin letter A...Z

4.4**base mode**

mode in which keys have their usual function such as selecting characters according to the active group and level

4.5**compact keyboard**

keyboard having at least the following 30 different keys: 26 keys for the Latin letters A...Z, Space key, Enter key; and having a function to select Level 2, function to select the group and/or level which contains the digits 0...9, and where the digits 0...9 have none of their own keys but are contained in a single level of a group

4.6**complementary group**

group that can be paired with another group in such a manner that on a full keyboard, it can be unified with the other group by incorporating its full content

Note 1 to entry: This is true of D-groups and L-groups.

Note 2 to entry: This doubles the input possibilities for the characters contained in the paired groups, but may be useful especially when the contents of such a pair are engraved on the keys according to the rules for a single group.

4.7**D-group**

group declaring characters associated to the levels 1 and 2 of any digit key, where the associations to the levels are independent on the level to which the digits themselves are in their group

4.8**digit key**

key associated with any digit 0...9

4.9**enter key**

key associated with an enter or return function

4.10**full keyboard**

keyboard having at least the following 39 different keys: 26 keys for the Latin letters A...Z, 10 keys for the digits 0...9, Space key, Enter key; and a level 2 selector key

Note 1 to entry: The digit keys typically enter the digits in level 1 or 2 of group 1.

Note 2 to entry: The level 2 selector key is usually called "shift key".

4.11**L-Group**

group which declares characters associated to levels 1 and 2 of any A to Z key and optionally of the Space key

4.12**latch to <a group>**

select a group in such a manner that only the next key actuation is affected, with the group reverting to the previously selected group (reference group) afterwards

4.13**latin keyboard**

keyboard with a layout which has all Latin lowercase letters a...z (U+0061...U+007A) in group 1 level 1, and all Latin uppercase letters A...Z (U+0041...U+005A) in group 1 level 2, each uppercase letter being associated with the same key as its lowercase counterpart, and which has a level 2 selector key which is either to be pressed simultaneously with the letter key or separately immediately before pressing the letter key, to select level 2

4.14

latin conformant keyboard

keyboard with a layout which has all Latin letters a...z and A...Z in a single group other than Group 1, where that group can be selected permanently, and which otherwise behaves as a Latin keyboard as long as that group is selected

4.15

mode

state which determines the effects of all the keys of a keyboard

4.16

reference group

group that is switched to, or reverted to after the actuation of a key has disengaged a group previously latched to

4.17

reference group switching mode

special mode where the next key actuation either switches to a new group or has the sole effect of generating an error signal to the user, should there be no group to be switched to when pressing that key

4.18

space key

key associated with character U+0020 SPACE

4.19

special mode

mode which is not the base mode, and where the functions of the keys are defined by the description of the mode

4.20

supplementary group

group not identical to the primary group of the national version keyboard layout or to the complementary Latin group layout (secondary group)

4.21

supplementary character collection

collection of characters contained in any supplementary group

4.22

superselect

function which, upon simultaneous or consecutive actuation of any A to Z key, latches or switches to a supplementary group

EXAMPLE Superselect can be a key, a combination of keys, or another function.

4.23

switch to <a group>

select a group or a mode which then stays in effect until another group or mode is selected, be it by switching to another group or selecting another reference group

4.24

symbol

graphical symbol which is neither a letter nor a digit nor a punctuation mark

Note 1 to entry: This definition does not apply to the term "symbol" as part of the phrase "graphical symbol" as defined in ISO/IEC 9995-1.

5 Groups and modes

5.1 General

The groups in this standard are denoted by a single Latin letter (if such a group is to be primarily used as a reference group which can be switched to, which does not exclude that such a group can also be latched to) or a combination of two Latin letters (if such a group is primarily designed to be latched to). For the latter ones, the first letter either denotes the single-letter-named group to which its content is related, or "D" for diacritics, or "Y" for symbols (including digits).

The group denoted "N" and all two letter combinations containing a "N" are reserved for national standards based on this standard and thus will not be used in future versions of this standard.

The group number according to ISO/IEC 9995-1 is computed for the former groups as "letter number $\times$ 100", for the latter groups as "first letter number $\times$ 100 + second letter number", where "letter number" is 1 for A, 2 for B, and so on until 26 for Z (e.g. "Group G" is "Group 700", "Group GE" is "Group 705").

This standard thus defines groups within the number range from "Group 100" to "Group 2626" (not filling this number range contiguously).

Group L matches the basic Latin letters to itself (lowercase letters in Level 1, uppercase letters in Level 2), as well as the space and the digits (in Level 1). All other groups are defined in Annex B.

All combining characters (accents, diacritical marks, etc.) contained in the groups defined in this standard are to be entered after their corresponding base character, according to the order in which they are to be stored according to ISO/IEC 10646, with the following single exception:

When the keyboard layout incorporates a secondary group according to ISO/IEC 9995-3:2010, or any "dead keys" in its primary group, the three combining characters contained in the group G ("Greek") are to be entered using the Dead Key method described in ISO/IEC 9995-3:2010.

NOTE This exception will enable users who only use the combining characters of the secondary group and the additional Greek combining characters contained in the group G ("Greek") defined in this standard, to use all combining characters in a uniform way.

5.2 Groups denoted by single Latin letters

The following table lists the Groups denoted by single Latin letters (all these groups are "L-Groups").

Table 1 — Groups denoted by single Latin letters

Key	Reference group selected by the key in the reference group switching mode	Symbol ^a
Q	Group Q (Georgian) ^c	105 ლ ^b
W	Group W (Armenian) ^d	105 Խ
E	<i>Reserved for future use</i>	
R	<i>Reserved for future use</i>	
T	<i>Reserved for future use</i>	
Y	<i>Reserved for future use</i>	
U	<i>Reserved for future use</i>	
I	<i>Reserved for future use</i>	

O	<i>Reserved for future use</i>	
P	Group A (Arabic)^e Switching to this group by this key also selects a mode "Eastern Arabic-Indian digits". This mode causes that digit keys which otherwise enter the standard decimal digits U+0030...U+0039 enter the according Eastern Arabic-Indic digits 06F0...06F9 instead. This mode stays in effect until another "reference group" selection is done.	105 U+06F5
A	Group A (Arabic) ^f	105 U+0628
S	<i>Reserved for future use</i>	
D	<i>Reserved for future use</i> (preferably a Group D "Devanagari")	
F	<i>Reserved for future use</i>	
G	Group G ("Greek")	105 Ω
H	Group H ("Hebrew")	105 ך
J	<i>Reserved for Group J ("Japanese" for Hiragana and Katakana)</i>	
K	Group K ("Korean Hangul") Switching to this group by this key also selects a mode "Hangul" (Hangeul). In this mode, one, two or three consonant (Jamo) can be input between two consecutive vowels (Jongseong, Syllable-peak letters). 1) If only one consonant Jamo is input, it will be replaced by a corresponding Choseong Jamo (Syllable-initial letter). 2) If two consonant Jamos are input, the first consonant Jamo will be replaced by a corresponding Jongseong Jamo (Syllable-final letter) and the second consonant Jamo will be replaced by a corresponding Choseong Jamo (Syllable-initial letter). 3) If three consonant Jamos are input, the first and second consonant Jamos will be replaced by a corresponding Jongseong complex Jamo (Syllable-final complex letter), and the third consonant Jamo will be replaced by a corresponding Choseong Jamo (Syllable-initial letter). 4) If no vowel precedes a consonant Jamo, it will be treated as in 1) above. 5) If no vowel follows one [or two] consonant Jamos, it [or they] will be replaced by a corresponding Jongseong Jamo [or Jongseong complex Jamo]. Implementations that replace the input of Jamo sequences by the appropriate Hangul characters when this mode is active, are compliant to this standard. This mode stays in effect until another "reference group" selection is done.	105 가 (U+AC00)
L	Group L ("Latin")	105 L
Z	<i>Reserved for future use.</i>	

X	Group A (Arabic). Switching to this group by this key also selects a mode "Arabic-Indian digits". This mode causes that digit keys which otherwise enter the standard decimal digits U+0030...U+0039 enter the according Arabic-Indic digits 0660...0669 instead. This mode stays in effect until another "reference group" selection is done.	105 U+0664
C	Group C ("Cyrillic")	105 Я
V	<i>Reserved for future use</i>	
B	<i>Reserved for future use</i>	
N	<i>Reserved for future use</i>	
M	<i>Reserved for future use</i>	

a The column "Symbol" denotes the number of the symbol in ISO/IEC 9995-7:2009 Amd1 for the group or mode selection when this selection function is associated to a single key (in addition to the "Superselect" mechanism described here), or is to be displayed on an on-screen keyboard after the actuation of "Superselect".

b If the symbol number is 105 "Switch to specific group", 106 "Latch to specific group", or 107 "Switch to specific mode". It is followed by the character to be enclosed by the symbol.

c "G" selects Greek

d "A" is reserved to select Arabic

e ; "P" stands for Persian/Pashto

f This selection deselects any mode selected as listed for keys "P" or "X", i.e. digit keys subsequently enter the standard decimal digits U+0030...U+0039

5.3 Other groups

The following table lists the other groups and the modes specified in this part of ISO/IEC 9995, according to the letter key which is to be pressed after or together with the "Superselect" function, as described in Clause 2.

Column G denotes whether the group is an L-Group, a D-Group, or E for an Extended D-Group.

Column labelled "CG" denotes the Complementary Group of a group if such one exists.

Column "Symbol" has the same meaning as in Table 1.

Table 2 — Other groups defined in this part of ISO/IEC 9995

Key	Function performed by this key when used with the "Superselect" function	G	CG	Symbol
Q	Latches to Group LQ ("Hook below") when Group L (Latin) is the reference group.	L		90
W	Latches to Group LW ("Hook above") when Group L (Latin) is the reference group.	L		91
E	Latches to Group LE ("Latin Extra Letters") when Group L (Latin) is the reference group.	L		106 X
	Latches to Group AE ("Arabic Extra Letters") when Group A (Arabic) is the reference group.	L		
	Latches to Group CE ("Cyrillic Extra Letters") when Group C (Cyrillic) is the reference group.	L		

	Latches to Group GE ("Greek Extra Letters") when Group G (Greek) is the reference group.	L		
	Latches to Group HE ("Hebrew Extra Letters") when Group H (Hebrew) is the reference group.	L		
	Latches to Group WE ("Armenian Extra letters") when Group W (Armenian) is the ref. group.			
R	Latches to Group LR ("Raised Latin Characters")	L	YT	93
T	Latches to Group LL ("Lowered Latin Characters")	L		94
Y	Latches to Group YY ("Compatibility characters and symbols") ^a Note:	L		106 ł
U	Latches to Group YU ("Universal compatibility").	D	YP	106 &
I	Switches to Mode "IPA" (International Phonetic Alphabet)			107 ə
O	Latches to Group YT ("Digits Raised and Lowered")	D	LR	95
P	Latches to Group YP ("Punctuation")	L	YU	106 #
A	Latches to Group DD ("Diacritics"). ^b Exception: Latches to Group DI ("Diacritics for IPA") when the mode "IPA" is active, treating the next key as independent ISO/IEC 10646 character.	L		106 ~
S	Latches to Group YS ("Symbols")	L		106 §
D	Switches to Mode "Unicode decimal".			103
F	Latches to Group LS ("Latin Supplement") when Group L (Latin) is the reference group. ^c	L		106 S
G	Latches to Group G ("Greek") ^d	L		106 Ω
H	Switches to Mode "Unicode hexadecimal"			104
J	Latches to Group DS ("Spacing Diacritics") Exception: Latches to Group DJ ("Spacing Diacritics and Symbols for IPA") when the mode "IPA" is active.	L	DM	106 ´
K	Switches to Mode "reference group switching mode" to switch to a group according to Table 1 by the subsequent key actuation. ^e			107 *

L	Latches to Group GE ("Greek Extra Letters") ^f	L		106 ϖ
Z	Latches to Group LZ ("Horizontal Stroke") when Group L (Latin) is the reference group. Latches to Group CZ ("Cyrillic Church Slavonic Letters") when Group C (Cyrillic) is the reference group.	L L		87 106 Α
X	Latches to Group LX ("Diagonal Stroke") when Group L (Latin) is the reference group. Latches to Group CX ("Cyrillic Additional Extra Letters") when Group C (Cyrillic) is the reference group.	L L		88 106 Ъ
C	Latches to Group YC ("Currency symbols")	L		106
V	Reserved for future use.			
B	Latches to Group DM ("Modifier letters")	D	DS	106 ~
N	Latches to any Group NN ("National") if such a group is defined by a national standard ^g	L		
M	Latches to Group YM ("Mathematical and extra symbols")	L	YU	106 ∞
[Space]	Switches to base mode and to Group 1 (whichever this is, depending on the national or manufacturer standard used)			107 ←
[Enter]	Function: Mode selection beyond the scope of this standard (if the device supports such a function).			
^a This group needs not to be implemented completely by any device claiming conformance to this standard; see Clause 2. ^b "A" is a mnemonic for "Accents". ^c For keyboards not having a secondary group according to ISO/IEC 9995-3:2010, the group LS does not need to be implemented. ^d This is useful to enter single Greek letters used as symbols. ^e "K" is a mnemonic for "Keyboard selection" ^f This is useful to enter single Greek special letters used as symbols. ^g e.g. containing precomposed letters frequent in the concerned language[s]				

6 Special keys

6.1 Use of the Backspace key

If the keyboard has a Backspace key, this shall operate as follows when pressed directly after a group selector, a mode switching key, or a level selector which does not act by simultaneous pressing with the concerned key: it simply cancels that group selection, mode switching, or level selection.

6.2 Recommended allocation of the Superselect function

On a keyboard layout which:

- has no dedicated key for the Superselect function;
- has no dedicated Symbol key;
- has a Level 3 Select key, and;
- has a Tab key which has no other character or function allocated on its Level 3;

the Superselect function should be allocated to the key combination Level 3 Select + Tab key.

NOTE1 The Level 3 select key is likely to have the engraving AltGr

NOTE2 This applies to several national layouts for full size keyboards.

6.3 The Secondary Superselect function

6.3.1 Secondary superselect function definition

Keyboards may allocate a Secondary Superselect function, which is defined as follows:

Table 3 — Secondary superselect function definition

Condition	Effect of Secondary superselect key		
	If actuated once	If actuated twice	If actuated three times
Reference group is Group L (Latin) and keyboard has a secondary group according to ISO/IEC 9995-3:2010	Latches to group LS (Latin supplement)		
Reference group is Group L (Latin) and keyboard has no secondary group	Latches to group LE (Latin extra letters)		
Reference group is Group C (Cyrillic)	Latches to group CE (Cyrillic extra letters)	Latches to Group CZ (Cyrillic church Slavonic letters)	Latches to CX (Cyrillic additional extra letters)
Reference group is Group G (Greek)	Latches to group GE (Greek extra letters)		
Reference group is group H (Hebrew)	Latches to group HE (Hebrew extra letters)		
Reference group is group W (Armenian)	Latches to group WE (Armenian extra letters)		

6.3.1.2 If it is actuated one time:

It latches to Group LS ("Latin Supplement") when Group L (Latin) is the reference group, and when the keyboard has a secondary group according to ISO/IEC 9995-3:2010.

It latches to Group LE ("Latin Extra Letters") when Group L (Latin) is the reference group, and when the keyboard does not have such a secondary group.

It latches to Group CE ("Cyrillic Extra Letters") when Group C (Cyrillic) is the reference group.

It latches to Group GE ("Greek Extra Letters") when Group G (Greek) is the reference group.

It latches to Group HE ("Hebrew Extra Letters") when Group H (Hebrew) is the reference group.

It latches to Group WE ("Armenian Extra letters") when Group W (Armenian) is the reference group.

6.3.1.3 If it is actuated two times consecutively:

It latches to Group CZ ("Cyrillic Church Slavonic Letters") when Group C (Cyrillic) is the reference group.

6.3.1.4 If it is actuated three times consecutively:

It latches to Group CX ("Cyrillic Additional Extra Letters") when Group C (Cyrillic) is the reference group.

6.3.2 Recommended allocation

On a keyboard layout which:

- has no dedicated key for the Secondary Superselect function;
- has a Level 3 select key;
- has a Backspace key which has no other character or function allocated on its Level 3;

the Secondary superselect function should be allocated to the key combination Level 3 Select + Backspace key.

NOTE The Level 3 select key is likely to have the engraving AltGr

7 The special modes "Unicode decimal" and Unicode hexadecimal"

These modes are to enter any valid ISO/IEC 10646 character, by entering their code point values as decimal resp. hexadecimal number.

NOTE 1 The names of these special modes reflect the fact that the character set defined by ISO/IEC 10646 is usually synchronized with the one defined by the industry standard "Unicode", the name of which is more popular and memorable, and is reflected in the "U"-like shapes of the ISO/IEC 9995-3 symbols which are associated with this special modes.

The mode "Unicode Decimal" works as follows:

All actuations of keys associated with decimal digits are temporarily stored into a sequence representing a decimal number. When any other key except a Backspace key is pressed, then, if the decimal number contains at least one digit and represents a valid ISO/IEC 10646 value, then the according character shall be output. If not, then a U+FFFD OBJECT REPLACEMENT CHARACTER shall be output, followed by the entered sequence of decimal digits. In any case, the temporary sequence shall be cleared.

Then, if the other key pressed is not an Enter key, a Decimal Separator key or a Space key, the keyboard shall be switched to base mode.

If the other key pressed is an Enter key, the keyboard shall be switched to base mode, and the Enter key itself shall not be processed further.

If the other key pressed is a Decimal Separator or a Space key, the mode "Unicode Decimal" shall persist, and the Decimal Separator key or Space key itself shall not be processed further.

If a Backspace key is pressed, while the temporarily stored sequence is not empty, the last digit appended to that sequence shall be dropped from that sequence.

NOTE 2 If a Backspace key is pressed, while the temporarily stored sequence is empty, the effect is not defined by this standard.

NOTE 3 The underlying software is allowed to erase the last entered ISO/IEC 10646 character from the input sequence but is not required to do so, as it is beyond the scope of this standard what happens to characters on completion of entering.

Thus, the user can enter any sequence of valid ISO/IEC 10646 characters by entering their decimal code values, separated by Space or decimal separator (which is especially convenient if any numeric keypad is used), and terminated by Enter.

The mode "Unicode Hexadecimal" works accordingly. Hexadecimal digits are all decimal digits and A...F and a...f, not differentiating between upper and lower case.

However, if on a compact keyboard, any decimal digit is associated with a key also associated with a letter A...F, the key when actuated without the Level 2 Selector key ("Shift key") active yields the decimal digit, while the same key actuated with the Level 2 selector key active yields the according hexadecimal digit A...F.

Valid ISO/IEC 10646 characters must have hexadecimal values between 0 and 10FFFF. Also, their value must not be in the intervals D800...DFFF (ISO/IEC 10646 surrogate points) and FDD0...FDEF (ISO/IEC 10646 noncharacters), and their value modulo hexadecimal 10000 must not be FFFE or FFFF (values guaranteed not to be a ISO/IEC 10646 character at all by ISO/IEC 10646). — The operating system may provide more restrictions, e.g. usage of a code position in a specific version of ISO/IEC 10646.

8 The special mode "IPA"

This mode is to enter IPA characters (i.e. characters of the International Phonetic Alphabet; see the reference in Clause 4 which is furthermore referred to as the "Handbook") as defined in the Appendix 2 of the Handbook (IPA numbers 100 to 599 and 901 to 911).

Regarding the IPA characters 217-219, 517-518, 908-909, and the later added IPA character 184, new mappings to ISO/IEC 10646 code points due to the development of ISO/IEC 10646 since the release date of the Handbook are taken into account.

NOTE 1: The "Extensions of the IPA: The ExtIPA chart" for the transcription of disordered speech (IPA numbers 601 to 799), as defined in Appendix 3 of the Handbook, are not covered by this standard.

This mode works as follows:

Each IPA character can be entered by a sequence of two keys.

For a "Phonetic consonant/vowel symbol code" (IPA numbers 101 to 399), this is a sequence of a letter key followed by a digit key, which selects the character according to the table presented in Annex C. On a compact

keyboard, the digit key may be pressed without actuating any group or level selector which would otherwise be necessary to select the digit as such.

The table in Annex C also presents such key sequences for some other frequent IPA characters.

NOTE 2 By this means, "ordinary schoolbook phonetics" which do not use other suprasegmentals than length marks and vertical strokes to indicate stress can be typed completely by using such sequences of a letter key + a digit key.

- Invalid key sequences of letter and digit keys (i.e. either two keys where the first one is a digit key or the second one is a letter key, or a sequence of a letter key and a digit key referring to an empty entry in the table in Annex C) yield the sequence of the two characters associated with these keys.
- The Enter key terminates the special mode "IPA"; it will not be processed further. If the Enter key is actuated after the entering of a letter key the letter associated with that key is yielded before.
- All keys other than letter and number keys work the same as when the special mode "IPA" is not selected. If such a key is actuated after the entering of a letter key the letter associated with that key is yielded before.

NOTE 3 Thus, a space is entered simply by actuating the Space key.

Especially, it is possible to latch to other groups by using the "Superselect" function in the usual way. Using "Superselect" to latch to the groups DI or DJ, all other IPA characters (i.e. "Phonetic diacritic and suprasegmental symbol codes" with IPA numbers 400 to 599, and "Transcription delimitation characters" with IPA numbers 901 to 911) can be selected.

NOTE 4 As the IPA characters 529 to 533 are not mapped onto single ISO/IEC 10646 characters, they will have to be entered as sequences of IPA characters 519 to 523 according to the ISO/IEC 10646 Standard (reference see Clause 4), p.251-252:

- for IPA 529 (rising contour), enter IPA 523 then IPA 519,
- for IPA 530 (falling contour), enter IPA 519 then IPA 523
- for IPA 531 (high rising contour), enter IPA 521 then IPA 519
- for IPA 532 (low rising contour), enter IPA 523 then IPA 521
- for IPA 533 (rising-falling contour), enter IPA 523 then IPA 521 then IPA 523.

On a full keyboard, the following additional input simplifications apply:

- A sequence of a dot followed by a letter key shall yield the character associated with the letter key in Group DI Level 1.
- A sequence of a comma followed a letter shall yield the character associated with the letter key in Group DI Level 2, without having to actuate any level 2 selector.
- A sequence of a dash followed by a letter shall yield the character associated with the letter key in Group DJ Level 1.
- A sequence of a key associated with any of the symbols "#", "+", "/", or "\", which is not also associated with a letter, digit, comma, dot, or dash, and a letter key shall yield the character associated with the letter key in Group DJ Level 2, without having to actuate any level 2 selector.
- If a letter key is followed by a letter key, the first letter key shall the associated letter, and the second letter key is treated as the first letter of a new sequence of a letter key followed by a digit key.
- If a digit key is actuated not as the second key of a sequence of a letter key followed by a digit key, it shall yield the digit directly.

9 References to characters not contained in ISO/IEC 10646:2017

Table 4 — List of the characters referenced in this standard which are not defined in  ISO/IEC 10646:2017 , together with code points from the PUA (Private Use Area) of ISO/IEC 10646 by which they are referenced in several tables in the appendices of this standard

U+EF0C	Latin letter small capital q
U+EF11	Latin letter small capital x
U+EF35	Latin subscript small letter b
U+EF36	Latin subscript small letter c
U+EF37	Latin subscript small letter d
U+EF38	Latin subscript small letter f
U+EF39	Latin subscript small letter g
U+EF3C	Latin subscript small letter q
U+EF43	Latin subscript small letter w
U+EF46	Latin subscript small letter y
U+EF48	Latin subscript small letter z
U+EF66	modifier letter small q
U+EF76	modifier letter capital c
U+EF77	modifier letter capital f
U+EF7B	modifier letter capital q
U+EF7C	modifier letter capital s
U+EF85	modifier letter capital x
U+EF86	modifier letter capital y
U+EF87	modifier letter capital z
 Text deleted 	
 Text deleted 	
U+F87C	Latin capital letter theta
U+F87D	Latin small letter theta
U+F891	Latin small letter lambda
U+F898	Latin capital letter lambda

U+F899	Latin capital letter lambda with stroke
U+F89E	modifier letter capital theta
U+F8C4	Latin capital letter African eng
U+F8C6	Latin small letter African eng

NOTE 1 The names given here are composed of lowercase letters, to distinguish them from names from ISO/IEC 10646 which are composed of uppercase letters.

NOTE 2 The PUA code points are selected in a way that they harmonize with some widespread character collections used by linguists, like MUFI (see <http://www.mufi.info>). Regarding the characters used by North American indigenous languages, the PUA code points are harmonized with the collection used by the Indigenous Language Institute, Santa FE, NM, USA (see <http://www.languagegeek.com>).

Implementations of this standard which refer to characters by ISO/IEC 10646 code points shall use the code points listed in table 9.1 for characters not contained in ISO/IEC 10646:2012, unless they make use of encodings of these characters defined in later editions of ISO/IEC 10646 than ISO/IEC 10646:2012.

Annex A (informative)

General information

The following character collections are mentioned in the Annex

- MES-1 (Multilingual European Subset 1):
collection 281 (titled MES-1) as specified in ISO/IEC 10646:2012
- MES-2 (Multilingual European Subset 2):
collection 282 (titled MES-2) as specified in ISO/IEC 10646:2012
- MLS (Multilingual Latin Subset):
collection 288 (titled MLS) as specified in ISO/IEC 10646:2012
- WGL4 (Windows Glyph List Version 4.0)
a set defined by Microsoft corporation; see <http://www.microsoft.com/typography/otspec/WGL4.htm>

A.1 Synopsis

This part of ISO/IEC 9995 intends to standardize a way to enable any users of any national keyboard adhering to that standard to enter all letters of their language (as long as it is written in a script supported by the current version and its amendments), not confined to European languages.

Moreover, it includes the input of other characters and symbols used in business, educational, academic, legal, administrative and personal use.

It contains all characters contained in MES-1, MES-2, MLS, and WGL4 (without being restricted to these sets), except characters only used for output (e.g. box drawing characters) and some obsolete characters (mostly of these are mapped to other characters by ISO/IEC 10646 canonical equivalence). It also contains the Latin characters used in contemporary languages outside Europe, including these for transliterating into Latin from languages using other scripts.

It relies on existing national keyboard layouts and does not define or recommend a worldwide or Pan-European layout. It is explicitly not intended to make national keyboard layouts or carefully designed keyboard layouts for any language superfluous.

It requires a set of distinctive keys associated with the 26 basic letters A...Z, a Space key, and a function to select Level 2 (usually a "shift key").

Thus, it is applicable to "compact" keyboards like these of PDAs, UMPCs (Ultra Mobile Personal Computers), Blackberry® devices.

Of course, it is also applicable to full keyboards like standard PC keyboards, which have separate keys for associated with the 10 digits.

NOTE "Associated with" means that there is a way to identify a key by the character (usually having the character engraved on the key). It does not necessarily mean that the character is the basic one typed by that key (e.g. on Greek or Cyrillic keyboards where Latin letters are reached by a special Shift or function key).

All other characters can be entered by the way specified in this part of 9995. This may include a duplication for some characters which are already contained in the national keyboard layout.

All additional characters are organized into groups (except some IPA characters which are entered using the special mode "IPA"). Thus, each of those characters is described by three values: – its group, – its association to a basic key [A]...[Z], [0]...[9], [space], – its level (1 = unshifted, 2 = shifted).

EXAMPLE The œ/Œ is in group LE ("Latin, Extra letters"), level 1 (unshifted) for œ, level 2 (shifted) for Œ. The group LE is selected by the special key or key combination "Superselect" (which may be the combination AltGr+Tab or another function specified by the national layout) + "E", followed by "O" to select the œ itself.

EXAMPLE The Hausa hooktop k̄ is a letter which is encoded in ISO/IEC 10646 as a composed form. It will be entered as "Superselect" + W (thus latching to the Group LW "Latin letters with hook above and related special characters"), following by "k".

Additionally, modes are specified to enter any valid ISO/IEC 10646 character (see Clause 7), to provide a standard way for this rather than relying unstandardized special functions of operating systems or any text processing software.

Especially, this standard shows a means for travellers using publicly available terminals (like at Internet Cafés) to enter any text in their native languages anywhere. They have to remember only the group and key associations for the special letters of their own languages (which are usually few, about 5 or 10).

A.2 The character repertoire of this standard

The character repertoire as specified implicitly by this document (consisting of all characters listed as associated with any key) is designed to meet the following main requirements:

- a. All current languages which use the Latin script are covered.
- b. To enable writing of proper names (e.g. in reference lists) and geographical names correctly, all transliteration systems for major current non-Latin languages into Latin should be covered.
- c. All symbols and punctuation marks which occur in good typography are covered.
This includes ZWNJ, e.g. to prevent the f-l ligature in German »Schilfinsel« according to the orthographic rules, unlike the Soft Hyphen, which must not prevent a f-f ligature in »Affe« when applied within the »ff«.
- d. All symbols which occur in business correspondence should be covered.

Additionally, it meets the following:

- e. It contains the few letters and symbols (long s, long r, Tironian et) needed for the script variants Gaelic and Fraktur, which despite to their historical appeal also have some contemporary use.
- f. It contains a small selection of historic letters (e.g. for Old English) and transliteration letters for historic scripts (for Egyptian hieroglyphs and Gothic), as these may be used in popular texts and texts for school use.
- g. It contains some characters for compatibility reasons.
- h. It contains the main characters for several other scripts (i.e. these which are needed for common languages using these scripts).
- i. It contains all IPA characters (except the specialized characters used for recording of disordered speech).
- j. It contains a basic mathematic character set for "everyday use" (while an extensive character set which would be needed for mathematical publications is not covered).

A.3 The design of an international keyboard extension

The goal of ISO/IEC 9995-9 is to provide a possibility to type the additional character repertoire using any keyboard which adheres to some prerequisites, without referring to the actual layout.

Especially, it is required that there are the Latin letters (either as primary or as a secondary group), together with some other universal characters (like digits).

Rather than relying on physical positions, this standard relies to the positions which the specific characters have on the basic layout. It seems far easier to communicate "to type æ, type AltGr+a" regardless whether the basic layout is QWERTY or AZERTY, rather than "to type æ, type AltGr together with the second key in the third row".

A.4 Layout Principles

- Diacritical marks to be applied above the base letters are associated to level 1 (unshifted) positions (as these are the most frequent ones); such marks applied below the base letters are associated to level 2 (shifted) positions. This also corresponds to the fact that the low line U+005F is found on a shifted position on some common keyboard layouts.
- The fact that only a limited character set is required for the base layout (see Clause 3) may lead to a certain duplication of graphic characters between the base layouts and the layout of the additional groups specified here. However, it allows the graphic characters of the groups specified here and their allocation to keys to be always the same for their use with any established Latin group layout.

A.5 Transliteration standards considered in this standard

Transliteration standards:

- ISO 9 — Cyrillic
- ISO 233, DIN 31635 — Arabic
- ISO 259 — Hebrew
- ISO 843 — Greek
- ISO 3602 — Japanese
- ISO 7098 — Chinese
- ISO 9984 — Georgian
- ISO 9985 — Armenian
- ISO 11940 — Thai
- ISO/TR 11941 — Korean Hangul
- ISO 15919 — Indic scripts

Other standards:

- ISO 5426 — bibliographic information interchange

A.6 Notes on single Groups:

A.6.1 Groups A (Arabic), AE (Arabic Extra letters):

Group A contains all letters needed for the Arabic language. The layout is based on the standard Arabic keyboard; letters that in this standard keyboard layout are associated with key positions which are not associated with basic Latin letters were moved to places where the Arabic keyboard has standard punctuation marks on keys associated with Latin letters.

Level 1 of Group AE adds all letters needed for Persian and Urdu.

Level 2 of Group AE adds all letters needed for Pashto. This includes letters used for several other languages spoken in Central Asia.

NOTE A peculiarity of the Arabic group is that some characters there are represented in ISO/IEC 10646 by a sequence of two atomic characters which combine into the selected characters by the rules of the Arabic script as handled by ISO/IEC 10646. As an example, the Arabic lam-alef is represented in ISO/IEC by a sequence of a lam and an alef, as these two characters (as long as no third character like an invisible "zero-width non-joiner" is interspersed) ligate in any case to a lam-alef.

A.6.2 Groups C (Cyrillic), CE (Cyrillic Extra letters), CX (Cyrillic Additional Extra Letters), Group CZ (Cyrillic Church Slavonic Letters):

As the Cyrillic alphabet consists of more than 26 letters, not all letters could be assigned within **Group C** which can take 26 letters (each with lower and upper case variants as in Latin). Therefore, some letters are assigned within **Group CE**, preferably those which are not used in all languages or which are in some ways variants of other letters.

Covering the letters needed for modern Russian, Bulgarian, Serbian, Macedonian, Belarussian, Ukrainian, Mongolian, Kazakh, Kyrgyz, and Uzbek, there are a total of 51 letters needing to be distributed on two groups (C and CE). The resulting gap of one letter in Group CE is filled with the precomposed letter Ъ, thus Russian can be written without recurring to diacritical letters at all (as long as you do not want to use the letter Ё, which can be entered using diacritics as usual). The users of the other mentioned languages find their needed diacritics in Group DD.

Group CX contains letters needed for several minority languages of the former Soviet Union (including Abkhaz and Bashkir).

Group CZ contains historic letters, thus complementing the groups C and CE to cover the whole Cyrillic alphabet. These letters are needed for pre-1918 Russian orthography and for Church Slavonic (which is contemporarily used by scientists, hobbyists and in religious context). Letter variants which are separately encoded in ISO/IEC 10646 are included as separate letters (zemlya, dzelo, monograph uk, yeru with back yer, iotified a).

A.6.3 Group DD (Diacritics):

Group DD can be latched to by Superselect+A.

Level 1 contains diacritical marks which are placed above the base letter ("accents") for Latin, Greek, and contemporary Cyrillic.

Level 2 contains diacritical marks which are placed below the base letter for Latin and Greek. Also, it contains overstriking diacritics, and diacritics for Church Slavonic (although these are placed above the base letter).

A.6.4 Group DI (Diacritics for IPA):

Group DI contains all combining diacritics contained in IPA and will be selected by Superselect+A in the same way as and instead of Group DD when the special mode "IPA" is active. All diacritics contained in both groups DD and DI are selected by the same key combination.

A.6.5 Group DJ (Spacing Diacritics and Symbols for IPA):

Group DJ contains all IPA characters which are not letters (and thus are entered in the special mode "IPA" by sequences of a letter key + a digit key) and not combining diacritics (and thus contained in Group DI).

Especially, all "transcription delimitation characters" (IPA characters 901 to 911) are doubled in this group even if they are already contained in another group like Group YS.

A.6.6 Group DS (Spacing Diacritics); Group DM (Modifier Letters):

Group DS contains the spacing versions of the diacritics contained in Group DD at the same key combinations, as far as such spacing versions exists. Most of such characters act as modifier letters.

Modifier letters which do not correspond to a combining diacritic are contained in Group DM, which also contains the Khoisan click letters.

As an exception, at the 5 key combinations which denote Old Cyrillic (Church Slavonic) diacritics in Group DD, there the Group DS contains 4 Chinantec tone marks, and the combining subscript letter "r" needed for some languages of Indonesia (which is a singleton in the character repertoire defined by this standard).

A.6.7 Groups G (Greek), GE (Greek Extra Letters):

Group G can be latched to by Superselect+G (to enter single Greek letters as symbols) or switched to by Superselect+G (to enter Greek text).

Group G is modelled after the standard Greek keyboard. As the classical (Attic) and the modern Greek alphabet contains 25 letters (24 proper letters + the final sigma), the Group G contains all letters for classical and modern Greek. The needed diacritical marks are all contained in Group DD. However, the three diacritical marks which are not contained in the secondary group specified in ISO/IEC 9995-3:2010 are duplicated; thus, on keyboard layout using this secondary group, the group DD does not to be used at all to type classical Greek.

Group GE contains some pre-classical and Byzantine letters and symbols, and letter variants preferred by some when using Greek letters as mathematical symbols.

A.6.8 Groups H (Hebrew), HE (Hebrew Extra letters):

The Hebrew alphabet originally consists of 22 letters, 5 of them having special final forms, thus yielding 27 letters to be selectable for keyboard input. The Hebrew standard keyboard has the complete set of upper case Latin characters A...Z in the shifted position (i.e. Level 2) of the base layout (i.e. Group 1), resembling the standard QWERTY layout. 26 of the 27 Hebrew letters are associated with these keys (24 of them in the position of the Hebrew standard keyboard). Thus, one Hebrew letter (the final tsadi) is left in a shifted position.

Also, there are three extra letters to write the Yiddish language, which are reached on the Hebrew Standard keyboard by simultaneous AltGr pressing (i.e., they are in Group 2).

Group H, as it is confined to the keys associated with the Latin letters A...Z, reorders the final tsadi into the shifted position of the tsadi.

Thus, if Group H is switched to on a Hebrew standard keyboard (e.g. to get access to the common niqqud including the rafe for Yiddish, or to the "true Hebrew punctuation"), all Hebrew letters are retained in their place (the final pe, tav, and final tsadi are simply duplicated).

The three Yiddish letters are retained in their position from the Hebrew standard keyboard, but are in Group H on the shifted position (i.e. Level 2).

Also, Group H contains the common niqqud and Hebrew punctuation (maqaf, pasuq and paseq), as well as the "new sheqel" symbol. Thus, Hebrew can be written with its specific punctuation marks (rather than recurring to the similar standard punctuation dash, colon, and vertical line, as it is required when using the standard Hebrew keyboard).

Group HE (Hebrew Extra letters) contains the rest of the niqqud, the nun hafukha, and all cantillation marks included in ISO/IEC 10646. Thus, any biblical or Torah text can be written in all details.

For special use of the meteg and for combinations of cantillation marks, the ZWNJ, ZWJ, and CGJ (duplicated from Group YP) are included also. See the Unicode 5.0 Standard, section 8.1, p.266/267.

A.6.9 Group K (Korean Hangul):

The modern Korean Hangul consists of 51 *jamo*. 24 of *jamo* are equivalent to letters of the Latin alphabet. The other 27 *jamo* are clusters of two or sometimes three of these letters. The Korean Hangul standard keyboard contains 14 simple consonant letters, 5 double letters (glottalized), and 6 simple vowel letters, 4 simple iotized vowel letters (semi consonant-semi vowel) and 4 diphthongs, which are distributed onto 26 keys corresponding to a A...Z letter key on a QWERTY keyboard. Consonants occupy the left side of the layout, while vowels are on the right. The 26 letters are in Level 1 and the 7 letters are in Level 2 where are reached by Shift key.

A.6.10 Group L (Latin):

Group L maps the letters 1:1 and therefore is not listed in Annex B.

A.6.11 Group LR (Latin, Raised):

Some raised letters are in fact used in some orthographies, e.g. " in Minnan, "w in some First Nation languages of British Columbia (Canada).

A.6.12 Group LS (Latin Supplement):

Group LS is devised for keyboards which have a Supplementary Group according to ISO/IEC 9995-3:2010, and does not double the characters addressed there. It does not need to be implemented for keyboard layouts which do not have such a secondary group, as for these keyboards, accessing of additional characters using the other Latin groups (especially LE) is more appropriate.

This group, while containing characters which also are contained in other groups like LE or LQ, is introduced to enable an US standard keyboard augmented by ISO/IEC 9995-3 to cover all African languages and all North American indigenous languages using the Latin script (and English historic orthographies) by additionally accessing Groups LS, LR, LW and LQ only. Especially, this avoids the duplication of character input sequences, as Group LS—unlike e.g. Group LE — does (with few exceptions) not contain characters which also are contained in the secondary group defined by ISO/IEC 9995-3.

Especially, Group LS is suited to be engraved as tertiary group on keyboards showing the secondary group according to ISO/IEC 9995-3.

A.6.13 Group Q (Georgian):

The modern Georgian alphabet (Mkhreduli) consists of 33 letters without a distinction between upper and lower case. The Georgian standard keyboard contains these together with 6 archaic letters which are distributed onto 33 keys, 7 of these do not correspond to a A...Z letter key on a QWERTY keyboard. The modern letters are in Level 1, where the archaic letters are reached by Alt Gr (thus, the Level 2 key ("Shift key") is not used for letters).

In this part of 9995, the 7 modern letters which are beyond the QWERTY letter positions on the standard keyboard are reordered into Level 2, together with the 6 archaic letters (retaining their key associations as far as possible). Additionally, some special letters for minority languages and some special punctuation are included in level 2.

A.6.14 Groups W (Armenian), WE (Armenian extra letters):

The Armenian alphabet contains 38 characters occurring in lower and upper case. The layout of this group is based on the Eastern Armenian keyboard layout (which is preferred in the country of Armenia itself, while the Western Armenian layout is preferred in the Armenian diaspora). The 12 letters not corresponding to an A...Z letter key of the QWERTY layout are grouped in the Group WE (Armenian Extra letters). This group contains also some ligatures and special punctuation (including U+2024 ONE DOT LEADER as Armenian semicolon).

A.6.15 Group YC (Currency symbols):

There is intentionally much space left in this group for currency symbols invented in the future. The US dollar symbol ("\$") is not contained in this group as it acts not only as a currency symbol but also as a special symbol in several programming languages (and is accordingly regarded as an universal symbol).

The key [f] Level 1 currently doubles the Latin small letter f with hook which is assigned to Group LQ, also key [f] Level 1, as this character is used as the Florin symbol also in ISO/IEC 10646:2012. If the relevant committees decide to disunify the Florin symbol from the Latin small letter f with hook, the [f] Level 1 shall yield the code for Florin symbol in Group YC and the code for the Latin small letter f with hook in Group LQ.

A.6.16 Group YM (Mathematical and extra symbols):

This group contains mathematical and other symbols which are contained in MES-2 and are not contained in other groups defined in this standard, plus some additions according to recent use. Also, for some characters a typographically more pleasant alternative is included (e.g., as the square root symbol (U+221A) is often used as a check mark, a "real" check mark (U+2713) is included).

Some notable additions are U+2423 as a Space symbol and U+21B2 as a Return symbol to describe keyboard input.

The Arabic ornate parentheses (U+FD3E, U+FD3F) are included as they are used by some to indicate citations from Koran translations in Latin text also.

A.6.17 Group YP (Punctuation):

Group YP contains (besides several other characters) the different quotes. The more frequent double quotes are located on Level 1, while the corresponding single quotes are located on Level 2 of the same key. Thus, the "typographical apostrophe", which is the same character as the English right single quote (U+2019), is located on Level 2 of the [I] key.

A.6.18 Group YS (Symbols):

Group YS contains symbols with frequent business, private, and educational use.

Also, it contains typographically preferable variants of some common "ASCII" characters whose appearance is usually hampered by their universal use.

If any symbol is based on a letter it is associated with that letter and the appropriate level (e.g. ® is on [R] level 2).

A.6.19 Group YU (Universal compatibility):

This group contains the 20 "ASCII" characters which are contained in all national variants of ISO 646. As such, they can be expected to be enterable on any keyboard (at least on any full keyboard), but presenting them in this group enables any user to enter these characters in an uniform way on all keyboards conforming to this standard, without having to search them for on any national keyboard not familiar to the user.

These 20 "universal ASCII symbols" are: U+0021 ... U+0022, U+0025 ... U+002F, U+003A ... U+003F, U+005F, i.e.: ! " % & ' () * + , - . / : ; < = > ? _

A.6.20 Group YY (Compatibility characters and symbols):

Group YY contains some characters and symbols (especially outdated combined letters, and geometrical shapes) present in other standards, standard keyboards, common fonts, or character sets used by specific user groups, which are included in this standard only for this reason.

NOTE: Regarding the ligatures fi and fl contained in this group, see the note at the end of the following notes on "Fraktur".

A.7 Notes on the Latin script variant "Fraktur" (Blackletter)

It is possible to enter Fraktur (Bla%letter) when using a correctly designed ISO/IEC-10646-compatible font (which does not hold for almost all Fraktur fonts currently available). The two characters needed beyond the usual Latin letters are s (the long s, U+017F, in Group LE at [s] Level 1) and the "Tironian et" (used only in the abbreviation £\$. "etc."; U+204A, in Group YS at [M] Level 2).

NOTE 1 The "Tironian et" is often misnamed "r rotunda" as it has developed a similar form in Fraktur. For Fraktur fonts which misrepresent the "Tironian et" as "r rotunda", or which supply a real "r rotunda" (U+A75B) like ʀ to use as "r" after o (o), this character is supplied as "compatibility character" in Group YY at [r] Level 1.

Also, the hyphen - (U+2010, in Group YP at [b] Level 1) and the minus sign – (U+2212, in Group YS at [y] Level 1) have a definitely different appearance in Fraktur, and the "ASCII" hyphen-minus (U+002D, "dash") has to have the appearance of the hyphen - in Fraktur fonts due to its prevalent use, while the inclusion of the separate minus sign – (U+2212) is advisable for such fonts.

The German typesetting rules for Fraktur contain obligate ligatures, namely c, %, >, |, ³, ®, §, ¥, @, <, #, {. This ligatures may not be applied e.g. at the compound borders of compound words, e.g. in Brotzeit ("Brotzeit" = "bread time" = a kind of snack) the tz ligature { is not allowed, while it is required in Ka{e ("Katze" = cat).

Correctly designed ISO/IEC-10646-compatible fonts generate such ligatures automatically if the text contains the underlying character sequences, as it is mandatory anyway for other scripts like Arabic or Devanagari. As it is the case for these scripts, ISO/IEC 10646 supplies the special invisible character ZWNJ (zero width non-joiner, U+200C, in Group YP at [X] level 1) which is to be inserted at the places where ligating may not occur. Thus, for the example above, Brotzeit is to be typed "Brot[ZWNJ]zeit" (as long as no automatic spelling correction is active).

NOTE 2 The same applies also outside Fraktur, e.g. the German typesetting rules allow no "fi" ligature in "Schilfinsel" ("reed island") which therefore has to be entered as "Schilf[ZWNJ]insel" when using a "smart font". As it is expected that such "smart fonts" become standard for Latin as they already are for Arabic and Devanagari, supplying separate characters for ligatures like fi and fl is considered obsolete anyway.

A.8 Notes on the special mode "IPA":

The table in Annex C is organized such that usually all variants of a Latin letter are selected by that letter first.

The digit (the second character of the input sequence for an IPA character) intentionally selects:

- 0: the base letter itself
- 1: a raised form
- 2: a capitalized form
- 3: a turned form
- 4: a hooktop form
- 5: a Greek form
- 6: a tailed form
- 7: a barred form
- 8: a variant form (e.g. with curl)
- 9: a ligated form

This is only used as an outline, as the IPA characters are not organized this way. Therefore, most numbers select similar or completely different variants.

Furthermore, there are some exceptions to the rule that variants of a letter are selected by the base letters:

- Click letters are filed under the letter "f".
- Glottal stop and variants based on that letterform are filed under the letter "q".
- As there are more than 10 variants given for the letter "t", three ligated forms of "t" are filed under "x".

Besides the official IPA characters, the table contains the 6 characters of the ISO/IEC 10646 IPA Extensions block which do not correspond to an IPA numbered character (U+0256, U+025D, U+027F, U+0285, U+02AE, U+02AF), and 3 letters commonly used by sinologists while not being official IPA characters (U+0234, U+0235, U+0236).

Annex B (normative)

Group definition tables

Rather than recurring to absolute positions on the keyboard, the additional characters are assigned to the 37 keys mentioned in Clause 3 which are denoted by the associated character enclosed in brackets, namely to [A] ... [Z], [0] ... [9], and [Space].

This implies that this standard defines a means to identify the keys needed for the additional characters, rather than to define absolute locations.

For some characters, there is provided (in parentheses) one example of the languages which use it (such language examples are not intended to denote the only or most prominent of such languages) or another explanation of the use of that character.

NOTE The tables of Annex B and the complete texts of the subsequent Annexes C through E are generated by a special software which has the group definitions and IPA mode tables incorporated. The original data is contained in that software; thus, any changes in the subsequent text must be incorporated in that software.

B.1 Group A: Arabic; Group AE: Arabic Extra letters

	Group A, Level 1	Group A, Level 2	Group AE, Level 1	Group AE, Level 2
[Q]	U+0636 ض (dad)	U+064E َ (fatha)	U+0651 + U+064E (shadda+fatha)	U+0654 ْ (hamza-above)
[W]	U+0635 ص (sad)	U+064B ِ (fathatan)	U+0651 + U+064B (shadda+fathatan)	U+0671 ِ (alef-wasla)
[E]	U+062B ث (theh)	U+064F ُ (damma)	U+0651 + U+064F (shadda+damma)	U+06D0 ِ (e)
[R]	U+0642 ق (qaf)	U+064C ُّ (dammatan)	U+0651 + U+064C (shadda+dammatan)	U+200E (LRM)
[T]	U+0641 ف (feh)	U+0644 + U+0625 (lam-alef+hamza-below)	U+06BE ٲ (heh-doachashmee)	U+200F (RLM)
[Y]	U+063A غ (ghain)	U+0625 ِ (alef+hamza-below)	U+06C1 ٲ (heh-goal)	U+0653 ٲ (maddah-above)
[U]	U+0639 ع (ain)	U+0630 ٲ (thal)	U+06C2 ٲ (heh-goal+hamza-above)	U+0659 ٲ (zwarakay)
[I]	U+0647 ه (heh)	U+062C ٲ (jeem)	U+06C0 ٲ (heh+yeh-above)	U+0670 ٲ (superscript-alef)
[O]	U+062E خ (khah)	U+062F د (dal)	U+0688 ٲ (ddal)	U+0681 ٲ (hah+hamza-above)

[P]	U+062D ح (hah)	U+061B ؛ (arab.semicolon)	U+0686 ڄ (tcheh)	U+0685 ڄ (hah+three-dots-above)
[A]	U+0634 ش (sheen)	U+0650 َ (kasra)	U+0651 + U+0650 (shadda+kasra)	U+069A ڻ (seen+dot-below+dot-above)
[S]	U+0633 س (seen)	U+064D ِ (kasratan)	U+0651 + U+064D (shadda+kasratan)	U+06CD ى (yeh+tail)
[D]	U+064A ي (yeh)	U+0643 ك (kaf)	U+06CC ى (farsi-yeh)	U+06AB ڪ (kaf+ring)
[F]	U+0628 ب (beh)	U+0637 ط (tah)	U+067E پ (peh)	U+066D * (arab.star)
[G]	U+0644 ل (lam)	U+0644 + U+0623 (lam-alef+hamza-above)	U+06AF ڳ (gaf)	U+06B7 ٺ (lam+three-dots-above)
[H]	U+0627 ا (alef)	U+0623 أ (alef+hamza-above)	U+06D3 ٻ (yeh-barree+hamza-above)	U+066C , (arab.thousand s-separator)
[J]	U+062A ت (teh)	U+0640 ٬ (tatweel)	U+0679 ٺ (tteh)	U+067C ٽ (teh+ring)
[K]	U+0646 ن (noon)	U+060C ٫ (arab.comma)	U+06BA ڻ (noon-gunna)	U+06BC ڻ (noon+ring)
[L]	U+0645 م (meem)	U+061F ؟ (arab.question mark)	U+06D2 ٺ (yeh-barree)	U+066B ٫ (arab.decimal-separator)
[Z]	U+0626 ٺ (yeh+hamza-above)	U+0651 ّ (.shadda)	U+06D4 ٫ (arab.fullstop)	U+200D (ZWNJ)
[X]	U+0621 ء (hamza)	U+0652 ٬ (.sukun)	U+066A ٪ (arab.percentsign)	U+200C (ZWJ)
[C]	U+0624 ٺ (waw+hamza-above)	U+0648 ٺ (waw)	U+0698 ٺ (jeh)	U+06C7 ٺ (u)
[V]	U+0631 ڙ (reh)	U+0632 ڙ (zain)	U+0691 ڙ (rreh)	U+0696 ڙ (reh+dot-below+dot-above)
[B]	U+0644 + U+0627 (lam-alef)	U+0644 + U+0622 (lam-alef+madda-above)	U+06D6 ٺ (small-high-sad+lam+alef-maksura)	U+06C9 ڙ (kirghiz yu)
[N]	U+0649 ى (alef-maksura)	U+0622 ا (alef+madda-above)	U+06A9 ڪ (keheh)	U+0689 ڙ (dal+ring)
[M]	U+0629 ٺ (teh-marbuta)	U+0638 ڙ (zah)	U+06C3 ٺ (teh-marbuta-goal)	U+0693 ڙ (reh+ring)