

**ISO/IEC JTC 1/SC 2/WG 2 N2745-1  
PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS  
FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646<sup>1</sup>**

**Please fill all the sections A, B and C below.**

Please read Principles and Procedures Document (P & P) from <http://www.dkuug.dk/JTC1/SC2/WG2/docs/principles.html> for guidelines and details before filling this form.

Please ensure you are using the latest Form from <http://www.dkuug.dk/JTC1/SC2/WG2/docs/summaryform.html>.

See also <http://www.dkuug.dk/JTC1/SC2/WG2/docs/roadmaps.html> for latest *Roadmaps*.

**A. Administrative**

**1. Title: HPhags-pa script encoding**

2. Requester's name: China National Information Technology Standardization Technical Committee, Mongolian Agency for Standardization and Metrology

3. Requester type (Member body/Liaison/Individual contribution): Member body

4. Submission date: 2004-04-02

5. Requester's reference (if applicable): Users' Agreement Related to HPhags-pa script encoding

**6. Choose one of the following:**

This is a complete proposal: Yes

or, More information will be provided later: \_\_\_\_\_

**B. Technical - General**

**1. Choose one of the following:**

a. This proposal is for a new script (set of characters): YES

Proposed name of script: HPhags-pa script

b. The proposal is for addition of character(s) to an existing block: \_\_\_\_\_

Name of the existing block: \_\_\_\_\_

2. Number of characters in proposal: 57

**3. Proposed category (select one from below - see section 2.2 of P&P document):**

A-Contemporar \_\_\_\_\_ B.1-Specialized (small collection) B.1 B.2-Specialized (large collection)

C-Major extinct \_\_\_\_\_ D-Attested extinct \_\_\_\_\_ E-Minor extinct \_\_\_\_\_

F-Archaic Hieroglyphic or Ideographic \_\_\_\_\_ G-Obscure or questionable usage symbols \_\_\_\_\_

4. Proposed Level of Implementation (1, 2 or 3) (see Annex K in P&P document): 2

Is a rationale provided for the choice? NO

If Yes, reference: \_\_\_\_\_

5. Is a repertoire including character names provided? YES

a. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document? YES

b. Are the character shapes attached in a legible form suitable for review? YES

6. Who will provide the appropriate computerized font (ordered preference: True Type, or PostScript format) for publishing the standard?

Beijing Founder Electronics Co., LTD

If available now, identify source(s) for the font (include address, e-mail, ftp-site, etc.) and indicate the tools used: No.9, 5 Street, Shangdi, Information Industry Base, Haidian District, Beijing 100085, China . [vih@founder.com](mailto:vih@founder.com), tel: 86-10 62982266 ext 1466, fax: 86-10 629 81438

**7. References:**

a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided? Users' Agreement Related to HPhags-pa script encoding

b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached? No

**8. Special encoding issues:**

Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)?

No

**9. Additional Information:**

Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script. Examples of such properties are: Casing information, Numeric information, Currency information, Display behaviour information such as line breaks, widths etc., Combining behaviour, Spacing behaviour, Directional behaviour, Default

<sup>1</sup> Form number: N2652-F (Original 1994-10-14; Revised 1995-01, 1995-04, 1996-04, 1996-08, 1999-03, 2001-05, 2001-09, 2003-11)

Collation behaviour, relevance in Mark Up contexts, Compatibility equivalence and other Unicode normalization related information. See the Unicode standard at <http://www.unicode.org> for such information on other scripts. Also see <http://www.unicode.org/Public/UNIDATA/UCD.html> and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.

**C. Technical - Justification**

1. Has this proposal for addition of character(s) been submitted before? No  
 If YES explain \_\_\_\_\_
2. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)? \_\_\_\_\_  
 If YES, with whom? Yes, Chinese and Mongolian Research Institutions  
 If YES, available relevant documents: see the attached Bibliography
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included? \_\_\_\_\_  
 Reference: historical and linguistic research work, information technology use, or publishing
4. The context of use for the proposed characters (type of use; common or rare)  
 Reference: common in historical and linguistic research work
5. Are the proposed characters in current use by the user community? \_\_\_\_\_ Yes \_\_\_\_\_  
 If YES, where? Reference: linguists
6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP? Yes \_\_\_\_\_  
 If YES, is a rationale provided? \_\_\_\_\_  
 If YES, reference: Unicode and ISO/IEC 10646 Roadmaps
7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)? \_\_\_\_\_
8. Can any of the proposed characters be considered a presentation form of an existing character or character sequence? No \_\_\_\_\_  
 If YES, is a rationale for its inclusion provided? \_\_\_\_\_  
 If YES, reference: \_\_\_\_\_
9. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters? No \_\_\_\_\_  
 If YES, is a rationale for its inclusion provided? \_\_\_\_\_  
 If YES, reference: \_\_\_\_\_
10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character? No \_\_\_\_\_  
 If YES, is a rationale for its inclusion provided? \_\_\_\_\_  
 If YES, reference: \_\_\_\_\_
11. Does the proposal include use of combining characters and/or use of composite sequences? No  
 If YES, is a rationale for such use provided? \_\_\_\_\_  
 If YES, reference: \_\_\_\_\_  
 Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided? \_\_\_\_\_  
 If YES, reference: \_\_\_\_\_
12. Does the proposal contain characters with any special properties such as control function or similar semantics? Yes. Included in Proposal.  
 If YES, describe in detail (include attachment if necessary) \_\_\_\_\_
13. Does the proposal contain any Ideographic compatibility character(s)? No \_\_\_\_\_  
 If YES, is the equivalent corresponding unified ideographic character(s) identified? \_\_\_\_\_  
 If YES, reference: \_\_\_\_\_

# Proposal to Encode the HPhags-pa Script

## I . A Brief Account of the HPhags-pa<sup>1)</sup> Script

- (1) The HPhags-pa script was invented by HPhags-pa by a special edict of Khubilai Khan, Emperor Shi Zu of the Yuan dynasty, and in 1269 the Emperor issued another edict to implement his script across the country. In a few cases, the HPhags-pa script was used as late as the late Qing dynasty. The HPhags-pa script, which was at first called "New Mongol Script", and later called "state characters of Yuan dynasty", is a set of phonetic symbols for multi-lingual writing that can be used "to write and translate all languages". According to material so far discovered, the HPhags-pa script has been used to "write and translate" Mongolian, Chinese (Han), Tibetan, Turkic as well as Sanskrit, and also other languages yet to be deciphered. Needless to say, of the above-mentioned languages, Mongolian as the official language of Yuan dynasty, and Chinese, as the language widely used by so many ethnic groups in China, are the two major languages for which HPhags-pa script has been used. However, the HPhags-pa script is used in different ways to "write/translate" different languages, thus, Mongolian and Chinese (Han) are transcribed according to their sounds, whereas Tibetan and Sanskrit are in principle transliterated letter for letter.
- (2) As a special system of letters for "translating and writing" all languages, the HPhags-pa script is characterized by some striking features. The HPhags-pa alphabet is a very rich one, having more letters than enough for writing or translating any language and more often than not having certain compound letters to express a single sound. The HPhags-pa script is written from left to right, and from above downward, which follows the tradition of the Uighur-Mongol script and which is different from Tibetan though HPhags-pa adopted his letters from it, and is also different from Chinese, a major language which HPhags-pa letters are used to translate. The HPhags-pa system uses syllables as its writing unit, which differs from Mongol writing. In Tibetan, a symbol is used to indicate the delimiter of a syllable or a word, whereas the HPhags-pa script does not use any symbol to mark the limit of a syllable or a word. In HPhags-pa writing, the vowel letters are all combinations of a few elements, including isolate form, syllable-initial (or word-initial) form, syllable-medial (or word-medial) form, as well as syllable-final (or word-final) form, and which is quite different from Tibetan writing but is very much like Mongolian writing. In a word, the HPhags-pa writing has its own independent orthographic system, which as a whole differs from Tibetan, Mongolian and Chinese, hence is not a mere "variation" based on these languages though it has had direct or indirect relationship with them in its detail.
- (3) So far as we know, extant monuments written in HPhags-pa letters include the following kinds: (a) Inscriptions of the Yuan court like imperial edicts, the empress dowager's decrees, the prince's orders, the imperial master's instructions and various regulations concerning monasteries exempt from taxes and corvee issues by government departments; (b) Religious inscriptions. In all the above-mentioned important monuments and relics, HPhags-pa script is used to "write or translate" various languages; (c) Various gold, silver, copper and iron *pai-tzu* (tallies) for diplomatic envoys or officials bestowed by the emperor or military or administrative organizations; (d) Governmental seals and commanding officers' seals of various levels of the Yuan dynasty provided by *Li Bu* (i.e., Ministry of Education) under the *Zhong Shu* (State Council), paper banknotes and coins distributed by Yuan court as well as great numbers of private seals and signatures; (e) Books like *Menggu Ziyun* (Book of Chinese Rhymes) in HPhags-pa and Chinese (Han) writings and *Baijixing* (A Complete Guide to Surnames) remain relatively intact, while *Subhā ś itaratnanidhi* is block-printed fragments in Mongolian.
- (4) The HPhags-pa script has a square seal script designed specially for transliterating Tibetan characters. Judged by its form of script, this system of glyphs belongs to the HPhags-pa writing system: its forms were invented in imitation of the decorative style of HPhags-pa script; and just like HPhags-pa writing itself, this system of glyphs is also written from left to right, from above downward. Tibetan, however, has its own independent system inasmuch as it differs from HPhags-pa writing both in form of letters and structure of strokes. Specifically, Tibetan has a number of forms of letters which are either altogether wanting in HPhags-pa writing, or not quite the same as

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<sup>1)</sup> HPhags-pa was the inventor of the script. His is a Tibetan name and should be transliterated into HPhags-pa on the principle to be close to his name in his native language.

HPhags-pa writing. On the contrary, many forms of HPhags-pa letters are not adopted by this Tibetan system of square seal characters. All its glyphs for writing correspond with the 30 letters and 4 vowel glyphs in Tibetan. However, for lack of enough material on hand and in view of little research about it, in the present Proposal to Encode the HPhags-pa Script, we will not include its characters.

- (5) In the past, not so much material of HPhags-pa writing had been discovered, and what's more, its research has been mainly carried out outside China and Mongolia. Since the 1980's, however, emerged an unprecedented upsurge of research for HPhags-pa script in its native land China and Mongolia. In the past 20 years, a great amount of new material has been discovered; e.g., scholars in China and Mongolia have so far discovered more than 40 Mongolian written monuments in HPhags-pa letters instead of about 10 official monuments of the Yuan court before 1980. These discoveries include quite a few stone inscriptions as well as a number of extremely valuable first-hand monuments. Based on deepened research into HPhags-pa writing as recorded in such new material, scholars in China and Mongolia have published highly valuable monographs and treatises, in which they put forward a series of new ideas. Those all-sided and rather abundant materials possessed by Chinese and Mongolian scholars and the latest research results they have achieved, provide us with adequate scientific ground for the encoding of the HPhags-pa script.

The present situation, however, is that on the one hand now and then we discover new texts of HPhags-pa writing, on the other hand our research about the discoveries does not seem sufficient, and there still exist a large number of monuments, e.g., Chinese monuments written in HPhags-pa letters, which require our further research. That's why scholars have reached a common understanding on quite a number of problems concerning HPhags-pa script, but their opinions still vary on certain important problems. Therefore our attitude in formulating the code is to include as much as possible the problems on which opinions do vary. And as soon as those academic problems are solved, we can, according to the then conditions, revise, replenish and improve our HPhags-pa encoding. Major books we have consulted for formulating the present proposal are listed in the attached *Bibliography*.

## II. Views on How to Handle Certain Problems

As is mentioned above, though the HPhags-pa script is a system based on Tibetan and Sanskrit writings with reference to Mongolian spelling, it is an independent system with its own characteristic features quite different from any other writing system. Consequently, our emphasis ought to focus on these features of the HPhags-pa script itself in preparing our proposal to encode it. The following are roughly our views on how to handle certain problems in its encoding:

- (1) **Method of Encoding:** The majority of letters in HPhags-pa writing have their respective "variant presentation forms", the only difference being that some letters have relatively more variant presentation forms, others have fewer. So, according to relevant regulations in the *UCS*, a method called "nominal glyph" should be used to encode the HPhags-pa script, i.e., at first, we have to divide each letter in HPhags-pa script into "nominal glyph" and "variant presentation glyph", and then to encode each "nominal glyph." At the same time, we have to prepare "a variant presentation glyph set" and "regulations on the use of control symbol".
- (2) **Nominal Glyph:** According to the *UCS*, the "nominal glyph" is a glyph "to be used to denote, transmit, exchange, handle, input and present the written forms as well as additional signs of various languages". The majority of HPhags-pa letters have a few variants, from which one should be chosen as its "nominal glyph". It is above all the isolate form of a letter which is chosen, or, in the case of there being a few isolate forms, the one which appears the most frequently is to be chosen.
- (a) Each of the letters  A858,  A859,  A85A,  A85B and  A863 has only one isolate form, which is naturally chosen as its nominal glyph.
- (b) Letters like  A86B and  A855 have each two isolate forms  and , out of which we choose as nominal glyphs  and  which have a high frequency of appearance.
- (c) The three letters  A851,  A879 and  A87A have no isolate forms, so we adopt forms ,  and  which appear the most frequently.
- (d)  A856, 'OE' and  A857 'UE' are two indispensable basic vowels in the Mongolian language. Although their variant presentation glyphs are "compound letters" each consisting of two or three

"elements", they are regarded in the majority of academic monographs ( e.g., N. Poppe, 1941,1957; L. Ligeti, 1964, 1972; Ć. Šagdarsüreng, 1981, 2001; B. Bulag, 1983; Bao Xiang, 1984; A. Damdinsüreng, 1985, Tulgaguri, 1998; Y. Jančiw, 2002 et al ) as compound yet independent letters listed in their respective alphabet. Other scholars who have not included these two letter in alphabet, also say that "sometimes a double letter is used to represent one sound". The forms of

the two vowel letters  and  in the HPhags-pa system are based on the forms that represent the two vowel letters in Mongolian writing. The sounds they mark are not the mere combinations of their original glyphs A+E+O and A+E+U, instead what they mark are two other simple sounds *ö* and *ü* which have nothing to do with them. Therefore, it is necessary to distinguish them as two independent vowel letters instead of anything like "compound vowels" even in terms of information treatment; if not, these two vowel letters which take up 14.8% of the total number of letters, would cause numerous inconveniences in retrieval and sequential arrangement. The same is true if we take into consideration the "automatic transliteration of HPhags-pa text into Latin alphabet".

(e)  is a sign marking a nasal sound. It appears above a relevant syllable in writing, but does not occupy any space in the syllable, and the letter below it still keeps the syllable-initial position as its variant form.

**(3) Variant Presentation Glyph:** As is regulated in the UCS, the "variant presentation glyph" shows, "in presenting certain characters, the graphic symbol of an individual glyph; this symbol depends on the position of the given glyph with relation to other glyphs."

(a) Strictly speaking, each HPhags-pa letter has several "variant presentation forms". The majority of consonants can be divided into four variants which somewhat differ from each other, viz., isolate form, syllable-initial (or word-initial) form, syllable-medial (or word-medial) form and syllable-final (or word-final) form. For example, the letter A85E has its isolate form , syllable-initial form , syllable-medial form  and syllable-final form . A few letters each have less than four variants. Owing to different styles of script, there may appear cases in which several variants have the same form.

(b) The "variant presentation forms" of the HPhags-pa script are divided into "conditional variants" and "free variants" so far as different conditions of their appearance are concerned. Conditional variants are those that appear "with relation to the position of other glyphs", which include in turn "positional variant" and "postpositive variant". The four variants of the letter A85E are "positional variants", while the six variants , , , ,  and  which appear only after the five "reversed letters" , , ,  and  are "postpositive variants" conditioned by their preceding glyphs.

"Free variants" are those of one and the same letter that appear under the same condition.  and , or  and  which differ in strokes but mark the same sound, are "free variants".

(c) Certain glyphs mark two sounds in one language, but one sound in another language. The former are two different letters; the latter two free variants of one letter. Such pairs of glyphs as  and , and  and  mark one sound in Mongolian, but two sounds in Chinese texts. In our encoding, we'd better handle such glyphs as individual letters.

(d) By the "stroke variants" are meant variants slightly different in their size, thickness, length or sharpness of turn in the stroke. Glyph figures like , ,  and , which do not mark different sounds, nor any variant of a letter in certain cases, show only slight difference in calligraphy. Such "stroke variants" are not expressed in our encoding system.

(e) A vowel letter has more "positional variants". Apart from its normal isolate, syllable-initial, syllable-medial and syllable-final forms, it also has "postpositive variants" which appear after "reversed letters". One may distinguish a postpositive variant through its preceding letter. Still, there are cases in which normal letter variants (i.e., variants of non reversed letters) appear after "reversed letters", e.g., , which is to be chosen with the "variant selector".

(f) Various "free variants" are to be chosen with the "variant selector"

(g) With the "variant selector", we can distinguish various "free variants" of a certain letter. Thus, the letter  has its isolate-1<sup>st</sup> syllable-final form , its 1<sup>st</sup> syllable-initial &-medial form , its 2<sup>nd</sup> syllable-initial form , its 2<sup>nd</sup> syllable-medial form , and its 2<sup>nd</sup> syllable-final form . The "free variants" are distinguished with the "variant selector" practically like this:  → ;  →  VS1.

(h) For the figures of variant presentation glyphs and the use of the control symbol, please see the regulations in "A Users' Agreement Related to HPhags-pa Script.", which is designed for common use by various kinds of users (See the *Supplement*).

(4) **Joiner.** Since in HPhags-pa script, the syllable is the unit for joining, so the letters in one syllable should be joined together. While the majority of joined parts are on the right side of a letter, there are individual letters whose joined parts are on each letter's left side. The right joined parts after the non reversed letters and the left joined parts after them are the most common joining, without need for special selection, e.g.,  and . But the right joined parts after the "reversed letters" are special joining which requires special selection, e.g., . Only when the letter  is to be joined with its preceding glyph or with its following glyph, middle part connection is required; however, seeing that it is difficult to standardize the length of the joiner, we can design no middle joiner, and instead, handle it by means of such variants as  . To use the joiner will facilitate the connection of various letters, and also enable us to select the joined parts, moreover, it will decrease the number of variant presentation glyphs.

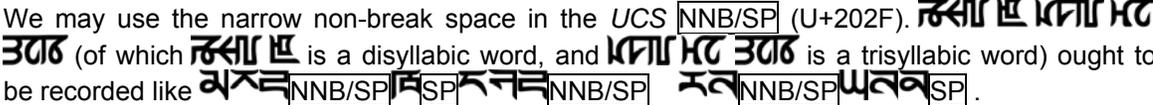
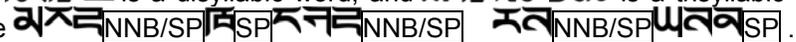
(a) The right joiner () is on the right side of a glyph and is used between glyphs joined on the right.

(b) The left joiner () is on the left side of a glyph and is used between glyphs joined on the left side.

For details of the two joiners, see *A Users' Agreement Related to HPhags-pa Script.*

(5) **Control Symbols:** The encoding of HPhags-pa script requires several control symbols:

(a) Three "free variant" selectors are needed in order to distinguish different "free variants" of a glyph that appear under the same conditions. The three variant selectors in UCS may be used, viz., VS1 (U+FE00), VS2 (U+FE01) and VS3 (U+FE02).

(b) A "syllable delimiter" should be used so as to distinguish the limit of a syllable and that of a word. We may use the narrow non-break space in the UCS NNB/SP (U+202F).  (of which  is a disyllabic word, and  is a trissyllabic word) ought to be recorded like .

(c) In order to present the positions of certain letters, we choose from the *General Punctuations* of the UCS the following two punctuation marks: ZWJ (ZERO WIDTH JOINER, U+200D) and ZWNJ (ZERO WIDTH NON-JOINER, U+200C).

ZWJ (ZERO WIDTH JOINER, U+200D) is used as follows:

1. Isolate form: (letter), e.g.,  → ;  → 

2. Syllable-initial form: (letter) ZWJ, e.g.,  → ;  → 

3. Syllable-medial form:  (letter) , e.g.,   → ;   → 

4. Syllable-final form:  (letter), e.g.,   → ;   → 

 ZERO WIDTH NON-JOINER (U+200C) is used as follows:

 is used in recording when normal positions are violated. Thus, a syllable-initial form at the end of a syllable can be recorded like:    →   ; or the common  when  is not used.

**(6) Punctuation Marks:** Very few punctuation marks are used in HPhags-pa writing. Judging by the monuments and sources now extant, we find the following six marks, whose figures are largely the same as Mongolian punctuation marks, and, having different functions, they have to be given different terms:

- (a)  HPHAGS-PA ONE DOT (A840)
- (b)  PHAGA-PA A DOUBLE DOT (A841)
- (c)  HPHAGS-PA FOUR DOTS (A842)
- (d)  HPHAGS-PA CIRCLE (A843)
- (e)  PAGES-PA JOINER (A844)
- (f)  HPHAGS-PA TIBETAN ANVSVARA (A845)

**(7) Signs of Indication:**

- (a) The HPhags-pa punctuation marks are preceded by the sign "HPHAGS-PA".
- (b) HPhags-pa letters used only to record Mongolian or to record Mongolian together with other languages are preceded by "HPHAGS-PA LETTER"; HPhags-pa letters not used to record Mongolian, but are used to record Chinese together with other languages are preceded by "HPHAGS-PA LETTER HAN"; HPhags-pa letters not used to record Mongolian or Chinese, but are used to record Tibetan or Tibetan together with other languages are preceded by "HPHAGS-PA LETTER TIBETAN"; HPhags-pa letters used only to record Sanskrit, but not to record Mongolian, Chinese or Tibetan, are preceded by "HPHAGS-PA LETTER SANSKRIT".
- (c) Letters of a given language are spelt in Latin letters close to the pronunciation of that language.
- (d) Glyphs which have the same meaning as those in the Mongolian Encoding should adopt as much as possible the signs of indication in Mongolian Encoding, otherwise the glyphs have to use different signs, e.g., ONE DOT, A DOUBLE DOT, FOUR DOTS.

**(8) Order of Encoding:** The letters of the HPhags-pa alphabet are arranged in quite different orders by various schools; hence, there has never existed, so to speak, a standard and universally acknowledged alphabet for the Hphags-pa script.

The HPhags-pa script is a writing system designed for multilingual purposes, just like Latin, Cyrillic, Arabic and Mongolian. So we may well consider the following principles:

- (a) Following the example of Mongolian encoding, the vowel letters are to be arranged before the consonant letters.
- (b) Consonant letters found in the "original alphabet" are arranged according to their accepted order, while the "newly added consonant letters" are arranged in the order of their similar letters and after the consonant letters of the "original alphabet".
- (c) The punctuation marks are put in the preceding line of letters (A840-A84F), as is the regular practice in the UCS.

**(9) Style of Script:**

The regular style is used in official monuments, tallies, stone tablets and books of the Yuan dynasty, with texts in Mongolian, Chinese, Tibetan or other languages. This is the most widely used style of the script. The regular style can be subdivided into Khubilai style (1277/1289)  and ; Togan style (1345)    and ; Juyong Pass style (1345)    and ; wood-engraved block style    and ; and fine style    and , etc. Besides, there appear in recent publications other styles of script, such as styles of HPhags-pa script in Soviet and Chinese academic publications.

The decorative style is mainly used in official seals, tablets and tallies of the Yuan dynasty. These are mainly Chinese materials written in decorative style. The HPhags-pa decorative style first appeared in *Menggu Ziyun* (Mongolian Rhymes) revised in 1308. The regular style and the decorative style of the HPhags-pa script are closely dependent upon each other in their figures.

The square style was mainly used in Tibetan Buddhist monasteries or on their seals, and continued to be in use in certain scope as late as modern times. Its figures differ greatly from the regular and the decorative styles.

We think that it is preferable to adopt a style which has been used in monuments written in HPhags-pa letters and at the same is to some extent standardized and looks smooth and beautiful. Hence, we have adopted for our present encoding the very style of HPhags-pa script found in Emperor Khubilai's edicts (1277/1289).

### References:

- 1) Andrew C. West : Response to comments on Phags-pa proposal in N2706 , ISO/IEC JTC1/SC2/WG2 N2719, March, 2004.
- 2) Proposal to encode the Phags-pa script, ISO/IEC JTC1/SC2/WG2 N2622, September, 2003.
- 3) ISO/IEC JTC1/SC2: Project subdivision proposal for ISO/IEC 10646: 2003/Amendment 1, WG2 N2706, October, 2003.
- 4) Principles on Encoding Phags-pa Script, ISO/IEC JTC1/SC2/WG2 N2666, October, 2003.
- 5) 包相: 蒙文研究, 蒙文研究, 蒙文研究, 蒙文研究, 蒙文研究, 蒙文研究, 1984 ( Bao Xiang: A Study on Mongolian Script, Educational Press of Inner Mongolia, 1984)
- 6) 布达格: 蒙文研究, 蒙文研究, 蒙文研究, 蒙文研究, 蒙文研究, 蒙文研究, 1983 (B. Bulag: A Brief History of Mongolian Script, People's Press of Inner Mongolia, 1983)
- 7) Н. Поппе: Квадратная письменность, Издательство академии наук СССР, 1941 ( N. Poppe: HPhags-pa Script, Press of U.S.S.R. Academy of Sciences, 1941)  
 — The Mongolian monuments in Hphags-pa script, edited by N. Poppe & John R.Krueger, Wiesbaden, 1957.  
 — 八思巴字蒙古语碑铭, 内蒙古文化出版社, 1986 (Tablet Inscriptions in ' Phags-pa-Mongolian Script, Cultural Press of Inner Mongolia, 1986)
- 8) Marian Lewicki, Newly Discovered Inscriptions in Phags-pa Script, Wilno, 1937.
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### HPHAGS-PA

|   | A84                      | A85       | A86       | A87       | A88       |
|---|--------------------------|-----------|-----------|-----------|-----------|
| 0 | A940<br>◦                | A850<br>𑀓 | A860<br>𑀔 | A870<br>𑀕 | A880<br>𑀖 |
| 1 | A841<br>◌̣               | A851<br>𑀗 | A861<br>𑀘 | A871<br>𑀙 | A881<br>𑀚 |
| 2 | A842<br>◌̣̣              | A852<br>𑀛 | A862<br>𑀜 | A872<br>𑀝 | A882<br>𑀞 |
| 3 | A843<br>◌̣̣̣             | A853<br>𑀟 | A863<br>𑀠 | A873<br>𑀡 | A883<br>𑀢 |
| 4 | A844<br>◌̣̣̣̣            | A854<br>𑀣 | A864<br>𑀤 | A874<br>𑀥 | A884<br>𑀦 |
| 5 | A845<br>◌̣̣̣̣̣           | A855<br>𑀧 | A865<br>𑀨 | A875<br>𑀩 | A885<br>𑀪 |
| 6 | A846<br>◌̣̣̣̣̣̣          | A856<br>𑀬 | A866<br>𑀭 | A876<br>𑀮 | A886<br>𑀯 |
| 7 | A847<br>◌̣̣̣̣̣̣̣         | A857<br>𑀲 | A867<br>𑀳 | A877<br>𑀴 | A887<br>𑀵 |
| 8 | A848<br>◌̣̣̣̣̣̣̣̣        | A858<br>𑀸 | A868<br>𑀹 | A878<br>𑀺 | A888<br>𑀻 |
| 9 | A849<br>◌̣̣̣̣̣̣̣̣̣       | A859<br>𑀼 | A869<br>𑀽 | A879<br>𑀾 | A889<br>𑀿 |
| A | A84A<br>◌̣̣̣̣̣̣̣̣̣̣      | A85A<br>𑀻 | A86A<br>𑀼 | A87A<br>𑀽 | A88A<br>𑀾 |
| B | A84B<br>◌̣̣̣̣̣̣̣̣̣̣̣     | A85B<br>𑀽 | A86B<br>𑀾 | A87B<br>𑀿 | A88B<br>𑀺 |
| C | A84C<br>◌̣̣̣̣̣̣̣̣̣̣̣̣    | A85C<br>𑀿 | A86C<br>𑀻 | A87C<br>𑀼 | A88C<br>𑀽 |
| D | A84D<br>◌̣̣̣̣̣̣̣̣̣̣̣̣̣   | A85D<br>𑀺 | A86D<br>𑀻 | A87D<br>𑀼 | A88D<br>𑀽 |
| E | A84E<br>◌̣̣̣̣̣̣̣̣̣̣̣̣̣̣  | A84E<br>𑀻 | A86E<br>𑀼 | A87E<br>𑀽 | A88E<br>𑀾 |
| F | A84F<br>◌̣̣̣̣̣̣̣̣̣̣̣̣̣̣̣ | A84F<br>𑀼 | A86F<br>𑀽 | A87F<br>𑀾 | A88F<br>𑀿 |

## A840

### A840 ◊ HPHAGS-PA ONE DOT

→ 1802 ◊ mongolian comma

### A841 ✱ HPHAGS-PA DOUBLE DOT

→ 1803 ✱ mongolian full stop

### A842 ✱✱ HPHAGS-PA FOUR DOTS

→ 1803 ✱✱ mongolian four dots

### A843 ○ HPHAGS-PA CIRCLE

→ 3002 ○ ideographic full stop

### A844 † HPHAGS-PA JOINER

→ 189A † mongolian nirugu

### A845 ॐ HPHAGS-P A TIBETAN ANUSVARA

→ 1880 ॐ mongolian letter ag anusvara one

→ 0901 ॐ devanagari sign candrabindu

→ 0F83 ॐ tibetan sign sna iIdan

**A846 (This position shall not be used)**

**A847 (This position shall not be used)**

**A848 (This position shall not be used)**

**A849 (This position shall not be used)**

**A84A (This position shall not be used)**

**A84B (This position shall not be used)**

**A84C (This position shall not be used)**

**A84D (This position shall not be used)**

**A84E (This position shall not be used)**

**A84F (This position shall not be used)**

### A850 ཨ HPHAGS-PA LETTER A

→ 0F68 ཨ tibetan letter a

### A851 ཀ HPHAGS-PA LETTER E

### A852 ཁ HPHAGS-PA LETTER EE

≡ 090F ए devanagari letter e

### A853 ག HPHAGS-PA LETTER I

→ 0F72 ག tibetan vowel sign I

### A854 ཏ HPHAGS-PA LETTER O

→ 0F7C ཏ tibetan vowel sign O

### A855 ཐ HPHAGS-PA LETTER U

## HPHAGS-PA

→ 0F74 ཐ tibetan vowel sign u

### A856 ཏྟ HPHAGS-PA LETTER OE

≡ 0911 ओँ DEVANAGARI LETTER CANDRA O

### A857 ཏྱ HPHAGS-PA LETTER UE

### A858 ཏླ HPHAGS-PA LETTER KA

→ 0F40 ཏླ tibetan letter ka

### A859 ཏྴ HPHAGS-PA LETTER KHA

### A85A ཏྵ HPHAGS-PA LETTER GA

### A85B ཏྶ HPHAGS-PA LETTER NGA

### A85C ཏྷ HPHAGS-PA LETTER HAN CA

→ 0F45 ཏྷ tibetan letter ca

### A85D ཏྸ HPHAGS-PA LETTER CHA

→ 0F46 ཏྸ tibetan letter cha

### A85E ཏྐྵ HPHAGS-PA LETTER JA

→ 0F47 ཏྐྵ tibetan letter ja

### A85F ཏྺ HPHAGS-PA LETTER HAN NYA

→ 0F49 ཏྺ tibetan letter nya

### A860 ཏྻ HPHAGS-PA LETTER TA

### A861 ཏྼ HPHAGS-PA LETTER THA

→ 0F50 ཏྼ tibetan letter tha

### A862 ཏ྽ HPHAGS-PA LETTER DA

→ 0F51 ཏ྽ tibetan letter da

### A863 ཏ྿ HPHAGS-PA LETTER NA

→ 0f53 ཏ྿ tibetan letter na

### A864 ཏྺྱ HPHAGS-PA LETTER PA

→ 0F54 ཏྺྱ tibetan letter pa

### A865 ཏྺྲ HPHAGS-PA LETTER HAN PHA

### A866 ཏྺླ HPHAGS-PA LETTER BA

→ 0F56 ཏྺླ tibetan letter ba

### A867 ཏྺྴ HPHAGS-PA LETTER MA

→ 0F58 ཏྺྴ tibetan letter ma

### A868 ཏྺྵ HPHAGS-PA LETTER HAN TSA

→ 091E ञ devanagari letter nya

**A869****A869** འ HPHAGS-PA LETTER HAN TSHA

→ 091C འ devanagari letter ja

**A86A** ཨ HPHAGS-PA LETTER HAN DZA**A86B** ས HPHAGS-PA LETTER HAN WA**A86C** ར HPHAGS-PA LETTER HAN ZHA

→ 0F5E ར tibetan letter zha

**A86D** ལ HPHAGS-PA LETTER ZA

→ 0F5F ལ tibetan letter za

**A86E** སྐ HPHAGS-PA LETTER MINUSCULE A

→ 0F60 སྐ tibetan letter -a

**A86F** ཡ HPHAGS-PA LETTER YA

→ 0F61 ཡ tibetan letter ya

**A870** རྩ HPHAGS-PA LETTER RA→ 0F62 རྩ tibetan letter ra  
≡ 0F61 རྩ tibetan letter ya**A871** ལྷ HPHAGS-PA LETTER LA

→ 0F63 ལྷ tibetan letter la

**A872** སྱ HPHAGS-PA LETTER SHA

→ 0F64 སྱ tibetan letter sha

**A873** སྲ HPHAGS-PA LETTER SA

→ 0F66 སྲ tibetan letter sa

**A874** སླ HPHAGS-PA LETTER HA

→ 0F67 སླ tibetan letter ha

**A875** སྤ HPHAGS-PA LETTER QHA

→ 0F41 སྤ tibetan letter kha

**A876** སྦ HPHAGS-PA LETTER HAN QWA**A877** སྦྷ HPHAGS-PA LETTER HAN FA**A878** སྨ HPHAGS-PA LETTER QA

→ 0F42 སྨ tibetan letter ga

**A879** ᠠ HPHAGS-PA LETTER HAN HALF

→ 18A6 ᠠ mongolian letter ag half u

→ 0FAD ᠠ tibetan subjoined letter wa

**A87A** ᠠᠨ HPHAGS-PA LETTER HAN HALF

YA

→ 18A7 ᠠᠨ mongolian letter ag half ya

**HPHAGS-PA****A88F**

→ 0FB1 ལྷ tibetan subjoined letter ya

**A87B** རྩ HPHAGS-PA LETTER SANSKRIT  
TTA**A87C** རྩ HPHAGS-PA LETTER SANSKRIT  
TTHA

→ 0F4B རྩ tibetan letter l tta

**A87D** རྩ HPHAGS-PA LETTER SANSKRIT  
DDA

→ 0F4C རྩ tibetan letter dda

**A87E** རྩ HPHAGS-PA LETTER SANSKRIT  
NNA

→ 0F4E རྩ tibetan letter nna

**A87F** ཡ HPHAGS-PA LETTER HAN YA**A880** སྱ HPHAGS-PA LETTER HAN SHA

→ 0F64 སྱ tibetan letter sha

**A881** སྲ HPHAGS-PA LETTER HAN HA

≡ 0F67 སྲ tibetan letter ha

**A882** སླ HPHAGS-PA LETTER HAN FHA**A883** (This position shall not be used)**A884** (This position shall not be used)**A885** (This position shall not be used)**A886** (This position shall not be used)**A887** (This position shall not be used)**A888** (This position shall not be used)**A889** (This position shall not be used)**A88A** (This position shall not be used)**A88B** (This position shall not be used)**A88C** (This position shall not be used)**A88D**(This position shall not be used)**A88E**(This position shall not be used)**A88F**(This position shall not be used)



**ISO**  
**International Organization Standardization**  
**Organization Internationale de Normalisation**

ISO/IEC JTC1/SC2/WG2  
Universal Multiple-Octet Coded Character Set  
(UCS)

ISO/IEC JTC1/SC2/WG2 **N2745-2**  
**2004-04-02**

**Title:** Summary of the 1st Joint Meeting on the HPhags-Pa Script Encoding  
**Source:** China National Information Technology Standardization Technical Committee  
Mongolian Agency for Standardization & Metrology  
**Status:** Joint Proposal  
**Action:** for discussion at the meeting in Markham, Canada, June, 2004.  
**Distribution:** for ISO/IEC JTC1/SC2/WG2 experts

I. From March 31 to April 2, 2004 is held in Hohhot, China, the First Joint Meeting for the HPhags-pa Script Encoding, attended by experts from Mongolian Agency for Standardization and Metrology, National University of Mongolia, and Mongolian National University of Education on one side and from China IT Standardization Technical Committee, State Nationalities Affairs Committee, Mongolian Language Working Committee of Inner Mongolia Autonomous Region and Inner Mongolia University on the other.

II. After careful study and discussion of the Documents SC2 N3696, WG2 N2622, WG2 N2719, participants of the present meeting appreciate the arduous efforts Mr. Andrew C. West has made in preparing his proposal to encode the HPhags-pa script and certain results he has achieved, but feel regret that his proposal largely fails to reflect those numerous new academic monographs on HPhags-pa script published mainly in Mongolian by scholars in China and Mongolia, native land of HPhags-pa script in the past 20 years, and what's more, Mr. West completely negates China's preliminary comments (N 2706) on SC2 N3696. Therefore, we consider it necessary to submit our overall opinions, opinions of China and Mongolia, in the form of *Proposal to Encode the HPhags-pa Script*.

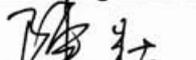
III. In order to regulate certain technical details which cannot have been included in the UCS, but are useful in the present Encoding of the HPhags-pa Script, at the present Meeting is formulated *A Users' Agreement Related to HPhags-pa Script* Both China and Mongolia will publish it in due time in the form of their respective "national standards". For the moment, we submit the Agreement separately to the ISO/IEC JTC1/SC2 and its WG2.

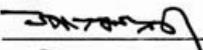
IV. An important meeting of decisive significance of the ISO/IEC JTC1/SC2/WG2 will be held in Canada in June, 2004, on the HPhags-pa script encoding. There is need for both China and Mongolia to send their experts to attend that meeting.

## SIGNATURES

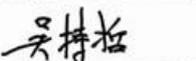
### On the Chinese side:

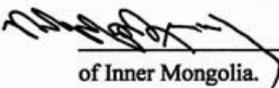
 Huchitu, Chairman of the Mongolian Language Working Committee of Inner Mongolia Autonomous Region.

 Chen Zhuang, Engineer, China National Information Technology Standardization Technical Committee.

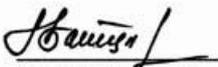
 Chojinzhab, Professor in Inner Mongolia University.

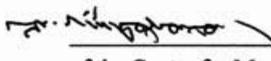
 Jalsan, Professor in Inner Mongolia University.

 Wu Chizhe, Professor in Inner Mongolia University.

 Hesige, Department head under Mongolian Language Working Committee of Inner Mongolia.

### On the Mongolian side:

 Gurragcha Battsengel, secretary of Standardization Technical Committee for ICT, Mongolian Agency for Standardization & Metrology.

 Tsevel Shagdarsuren, Prof., Dr. in Humanistic Sciences, Scientific Secretary of the Centre for Mongol Studies, National University of Mongolia.

 Domii Tumurtogoo, Academician, Dr. Professor in Mongolian National University of Education, Ulaanbaatar, Mongolia.

**ISO**  
**International Organization Standardization**  
**Organization Internationale de Normalisation**

ISO/IEC JTC1/SC2/WG2  
Universal Multiple-Octet Coded Character Set  
(UCS)

ISO/IEC JTC1/SC2/WG2 **N2745-3**  
**2004-04-02**

**Title: Summary of the User's Agreement Related to HPhags-pa Script**

**Source: China National Information Technology Standardization Technical Committee.,  
Mongolian Agency for Standardization & Metrology**

**Status: Joint Proposal**

**Action: for discussion at the meeting in Markham, Canada, June, 2004.**

**Distribution: for ISO/IEC JTC1/SC2/WG2 experts**

## **A Users' Agreement Related to HPhags-pa Script**

At the China-Mongolia Meeting held in Hohhot, China on March 31 – April 2, 2004, on the Encoding of the HPhags-pa Script, experts of both sides consider it necessary to stipulate *A Users' Agreement Related to HPhags-pa Script* in order to standardize certain technical details in the use of the HPhags-pa encoding which are not included in the *UCS*.

The present Agreement includes: ( I ) General Principle for the Encoding of HPhags-pa Script; ( II ) Nominal Glyphs and Their Names in the HPhags-pa Script; ( III ) Variant Presentation Glyphs and Their Names in HPhags-pa Script; and ( IV ) The Reference Table.

### **I .General Principle for the Encoding of HPhags-pa Script**

**(1) Method of Encoding:** The majority of letters in HPhags-pa writing have their respective "variant presentation forms", the only difference being that some letters have relatively more variant presentation forms, others have fewer. So, according to relevant regulations in the *UCS*, a method called "nominal glyph" should be used to encode the HPhags-pa script, i.e., at first, we have to divide each letter in HPhags-pa script into "nominal glyph" and "variant presentation glyph", and then to encode each "nominal glyph." At the same time, we have to prepare "a variant presentation glyph set" and "regulations on the use of control symbol".

**(2) Nominal Glyph:** According to the *UCS*, the "nominal glyph" is a glyph "to be used to denote, transmit, exchange, handle, input and present the written forms as well as additional signs of various languages". The majority of HPhags-pa letters have a few variants, from which one should be chosen as its "nominal glyph". It is above all the isolate form of a letter which is chosen, or, in the case of there being a few isolate forms, the one which appears the most frequently is to be chosen.

(a) Each of the letters  A858,  A859,  A85A,  A85C and  A863 has only one isolate form, which is naturally chosen as its nominal glyph.

(b) Letters like  A863 and  A86F have each two isolate forms  ,  . Out of which we choose as nominal glyphs  and  which have a high frequency of appearance.

(c) The three letters  A851,  A879 and  A87A have no isolate forms, so we adopt forms ,  and  which appear the most frequently.

(d)  A856, 'OE' and  A857 'UE' are two indispensable basic vowels in the Mongolian language. Although their variant presentation glyphs are "compound letters" each consisting of two or three "lexeme", they are regarded in numerous academic monographs ( e.g., N. Poppe, 1941,1957; L. Ligeti, 1964, 1972; Č. Šagdasarüeng, 1981, 2001; B. Bulag, 1983; Bao Xiang, 1984; A. Damdinsüeng, 1985, Tulgaguri, 1998; Y. Jančiw, 2002 et al ) as compound yet isolate letters listed in their respective alphabet. Other scholars who have not included these two letters in alphabet, also say that "sometimes a double letter is used to represent one sound". The forms of the two vowel

letters  and  in the HPhags-pa system are based on the forms that represent the two vowel letters in Mongolian writing. The sounds they mark are not the mere combinations of their original glyphs A+E+O and A+E+U, instead what they mark are two other simple sounds ö and u which have nothing to do with them. Therefore, it is necessary to handle them as two independent vowel letters instead of anything like "compound vowels" even in terms of information treatment; if not, these two vowel letters which take up 14.8% of the total number of letters, would cause numerous inconveniences in retrieval and sequential arrangement. The same is true if we take into consideration the "automatic transliteration of HPhags-pa text into Latin alphabet".

(e)  is a sign marking a nasal sound. It appears above a relevant syllable in writing, but does not occupy any place in the syllable, and the letter below it still keeps the syllable-initial position as its variant form.

**(3) Variant Presentation Glyph:** As is regulated in the *UCS*, the "variant presentation glyph" shows, "in presenting certain characters, the graphic symbol of an individual glyph; this symbol depends on the position of the given glyph with relation to other glyphs."

(a) Strictly speaking, each HPhags-pa letter has several "variant presentation forms". The majority of consonants can be divided into four variants which somewhat differ from each other, viz., isolate form, initial (in syllable or word) form, medial (in syllable or word) form and final (in syllable or word) form. For example, the letter A85E has its isolate form , syllable-initial form , syllable-medial form  and syllable-final form . A few letters each have less than four variants. Owing to different styles of script, there may appear cases in which several variants have the same form.

(b) The "variant presentation forms" of the HPhags-pa script are divided into "conditional variants" and "free variants" so far as different conditions of their appearance are concerned.

“**Conditional variants**” are those that appear "with relation to the position of other

glyphs", which include in turn "positional variant" and "postpositive variant". The four variants of the letter A85E are "positional variants", while the six variants ར, ལ, ས, ས, ས and ས which appear only after the five "reversed letters" ས, ས, ས, ས, ས and ( ར ) are "postpositive variants" conditioned by their preceding glyphs.

“Free variants” are those of one and the same letter that appear under the same condition. ས and ས, or ས and ས which differ in strokes but mark the same sound, are "free variants".

(c) Certain glyphs mark two sounds in one language, but one sound in another language. The former are two different letters; the latter two free variants of one letter. Such pairs of glyphs as ས and ས and ས and ས mark one sound in Mongolian, but two sounds in Chinese texts. In our encoding, we'd better handle such glyphs as individual letters.

(d) By the "stroke variants" are meant variants slightly different in their size, thickness, length or sharpness of turn in the stroke. Glyph figures like ས, ས, ས and ས, which do not mark different sounds, nor any variant of a letter in certain cases, show only slight difference in calligraphy. Such "stroke variants" are not expressed in our encoding system.

(e) A vowel letter has more "positional variants". Apart from its normal isolate, syllable-initial, syllable-medial and syllable-final forms, it also has "postpositive variants" which appear after "reversed letters". One may distinguish a postpositive variant through its preceding letter. Still, there are cases in which normal letter variants (i.e., variants of non reversed letters) appear after "reversed letters", e.g., ས, which is to be chosen with the "variant selector".

(f) Various "free variants" are to be chosen with the "variant selector".

(g) With the “variant selector”, we can distinguish various “free variants” of a certain letter. Thus, the letter ས has its isolate-1<sup>st</sup> syllable-final form ས, its 1<sup>st</sup> syllable-initial &-medial form ས, its 2<sup>nd</sup> syllable-initial form ས, its 2<sup>nd</sup> syllable-medial form ས, and its 2<sup>nd</sup> syllable-final form ས. The “free variants” are distinguished with the “variant selector” practically like this: ས → ས; ས → ས [VSI].

(4) **Joiner.** Since in HPhags-pa script, the syllable is the unit for joining, so the letters in one syllable should be joined together. While the majority of joined parts are on the right side of a letter, there are individual letters whose joined parts are on each letter's left side. The right joined parts after the non reversed letters and the left joined parts after them are the most common joining, without need for special selection, e.g., ས, ས, ས and ས, ས, ས, ས. But the right joined parts after the "reversed letters" are special joining which requires special selection, e.g., ས, ས, ས. Only when the letter ས is to be joined with its preceding glyph or with its following glyph, medial part connection is required; however, seeing that it is difficult to standardize the length of the joiner, we can design no medial joiner, and instead, handle it by means of such variants as ས, ས. To use the joiner will

facilitate the connection of various letters, and also enable us to select the joined parts, moreover, it will decrease the number of variant presentation glyphs.

- (a) The right joiner ( ◌ ) is on the right side of a glyph and is used between glyphs joined on the right.
- (b) The left joiner ( ◌ ) is on the left side of a glyph and is used between glyphs joined on the left side.

**(5) Control Symbols:** The encoding of HPhags-pa script requires several control symbols:

- (a) Three "free variant" selectors are needed in order to distinguish different "free variants" of a glyph that appear under the same conditions. The three variant selectors in UCS may be used, viz., VS1 (U+FE00), VS2 (U+FE01) and VS3 (U+FE02).
- (b) A "syllable delimiter" should be designed so as to distinguish the limit of a syllable and that of a word. It means that the limit of the syllables in a word ought to have a gap equal to one third of a space.. We may use the narrow non-break space in the UCS NNB/SP (U+202F). ལྷནཱུ་ལྷ་ལྷཱུ་ལྷཱུ་ལྷཱུ་ལྷཱུ་ལྷཱུ་ (of which ལྷནཱུ་ལྷ་ is a disyllabic word, and ལྷཱུ་ལྷཱུ་ལྷཱུ་ is a trisyllabic word) ought to be recorded like ལྷཱུ་NNB/SPལྷཱུ་NNB/SPལྷཱུ་NNB/SPལྷཱུ་NNB/SPལྷཱུ་NNB/SP.
- (c) In order to present the positions of certain letters, we choose from the *General Punctuation* of the UCS the following two punctuation marks: ZWJ (ZERO WIDTH JOINER, U+200D) and ZWNJ (ZERO WIDTH NON-JOINER, U+200C).

ZWJ (ZERO WIDTH JOINER, U+200D) is used as follows:

- 1. Independent form: (letter) , e.g., ལྷ → ལྷ;
- 2. Syllable-initial form: (letter) ZWJ, e.g., ལྷZWJ → ལྷ;
- 3. Syllable-medial form: ZWJ(letter) ZWJ, e.g., ZWJལྷZWJ → ལྷ;
- 4. Syllable-final form: ZWJ(letter), e.g., ZWJལྷ → ལྷ;

ZWNJ ZERO WIDTH NON-JOINER (U+200C) is used as follows:

ZWNJ is used in recording when normal positions are violated. Thus, a syllable-initial form at the end of a syllable can be recorded like: ལྷZWNJལྷ → ལྷཱུ་ ; or the common ལྷ when ZWNJ is not used.

**(6) Punctuation Marks:** Very few punctuation marks are used in HPhags-pa writing. Their figures are largely the same as Mongolian punctuation marks, and, having different functions, they have to be given different terms:

- (a) ◈ HPHAGS-pa ONE DOT (A840)
- (b) † HPHAGS-PA A DOUBLE DOT (A841)
- (c) ✦ HPHAGS-PA FOUR DOTS (A842)
- (d) ◦ HPHAGS-PA CIRCLE (A843)
- (e) ' HPHAGS-PA JOINER (A844)
- (f) ◌ HPHAGS-PA TIBETAN ANVSVARA (A845)

**(7) Signs of Indication:**

- (a) The HPhags-pa punctuation marks are preceded by the sign "HPHAGS-PA".
- (b) HPhags-pa letters used only to record Mongolian or to record Mongolian together with other languages are preceded by "HPHAGS-PA LETTER"; HPhags-pa letters not used to record Mongolian, but are used to record Chinese together with other languages are preceded by "HPHAGS-PA LETTER HAN"; HPhags-pa letters not used to record Mongolian or Chinese, but are used to record Tibetan or Tibetan together with other languages are preceded by "HPHAGS-PA LETTER TIBETAN"; HPhags-pa letters used only to record Sanskrit, but not to record Mongolian, Chinese or Tibetan, are preceded by "HPHAGS-PA LETTER SANSKRIT".
- (c) Letters of a given language are spelt in Latin letters close to the pronunciation of that language.
- (d) Glyphs which have the same meaning as those in the Mongolian Encoding should adopt as much as possible the signs of indication in Mongolian Encoding, otherwise the glyphs have to use different signs, e.g., ONE DOT, A DOUBLE DOT, FOUR DOTS.

**(8) Order of Encoding:** The letters of the HPhags-pa alphabet are arranged in quite different orders by various schools; hence, there has never existed, so to speak, a standard and universally acknowledged alphabet for the Hphags-pa script.

The HPhags-pa script is a writing system designed for multilingual purposes, just like Latin, Cyrillic, Arabic and Mongolian. So we may well consider the following principles:

- (a) Following the example of Mongolian encoding, the vowel letters are to be arranged before the consonant letters.
- (b) Consonant letters found in the “original alphabet” are arranged according to their accepted order, while the “newly added consonant letters” are arranged in the order of their similar letters and after the consonant letters of the “original alphabet”.
- (c) The punctuation marks are put in the preceding line of letters (A840-A84F), as is the regular practice in the UCS.

**(9) Styles of Script:** The letter figures found in HPhags-pa monuments can be classified under three styles, viz., regular style, decorative style and square style.

We think that it is preferable to adopt a style which has been used in monuments written in HPhags-pa letters and at the same time is to some extent standardized and looks smooth and

beautiful. Hence, we have adopted for our present encoding the very style of HPhags-pa script found in Emperor Khubilai's edicts (1277/1289).

## II Nominal Glyphs and Their Names in the HPhags-pa Script

| HPHAGS-PA |   |   |   |   |   |
|-----------|---|---|---|---|---|
|           | A84   | A85   | A86   | A87   | A88   |
| 0         | •<br>A940   | <br>A850   | <br>A860   | <br>A870   | <br>A880   |
| 1         | ◌<br>A841   | <br>A851   | <br>A861   | <br>A871   | <br>A881   |
| 2         | ◌<br>A842   | <br>A852   | <br>A862   | <br>A872   | <br>A882   |
| 3         | ◌<br>A843   | <br>A853   | <br>A863   | <br>A873   | <br>A883   |
| 4         | ◌<br>A844   | <br>A854   | <br>A864   | <br>A874   | <br>A884   |
| 5         | ◌<br>A845   | <br>A855 | <br>A865 | <br>A875 | <br>A885 |
| 6         | <br>A846 | <br>A856 | <br>A866 | <br>A876 | <br>A886 |
| 7         | <br>A847 | <br>A857 | <br>A867 | <br>A877 | <br>A887 |
| 8         | <br>A848 | <br>A858 | <br>A868 | <br>A878 | <br>A888 |
| 9         | <br>A849 | <br>A859 | <br>A869 | <br>A879 | <br>A889 |
| A         | <br>A84A | <br>A85A | <br>A86A | <br>A87A | <br>A88A |
| B         | <br>A84B | <br>A85B | <br>A86B | <br>A87B | <br>A88B |
| C         | <br>A84C | <br>A85C | <br>A86C | <br>A87C | <br>A88C |
| D         | <br>A84D | <br>A85D | <br>A86D | <br>A87D | <br>A88D |
| E         | <br>A84E | <br>A84E | <br>A86E | <br>A87E | <br>A88E |
| F         | <br>A84F | <br>A84F | <br>A86F | <br>A87F | <br>A88F |

**A840****HPHAGS-PA****A868**

- A840** ◦ **HPHAGS-PA ONE DOT**  
→ 1802 ◦ mongolian comma
- A841** ◦◦ **HPHAGS-PA DOUBLE DOTS**  
→ 1803 ◦◦ mongolian full stop
- A842** ◦◦◦◦ **HPHAGS-PA FOUR DOTS**  
→ 1803 ◦◦◦◦ mongolian four dots
- A843** ○ **HPHAGS-PA CIRCLE**  
→ 3002 ○ ideographic full stop
- A844** † **HPHAGS-PA JOINER**  
→ 189A † mongolian nirugu
- A845** ཨ **HPHAGS-PA TIBETAN ANUSVARA**  
→ 1880 ཨ mongolian letter ag anusvara one  
→ 0901 ཨ devanagari sign candrabindu  
→ 0F83 ཨ tibetan sign sna ldan
- A846** (This position shall not be used)
- A847** (This position shall not be used)
- A848** (This position shall not be used)
- A849** (This position shall not be used)
- A84A** (This position shall not be used)
- A84B** (This position shall not be used)
- A84C** (This position shall not be used)
- A84D** (This position shall not be used)
- A84E** (This position shall not be used)
- A84F** (This position shall not be used)
- A850** ཨ **HPHAGS-PA LETTER A**  
→ 0F68 ཨ tibetan letter a
- A851** ཨ **HPHAGS-PA LETTER E**
- A852** ཨ **HPHAGS-PA LETTER EE**  
≡ 090F ཨ devanagari letter e
- A853** ཨ **HPHAGS-PA LETTER I**  
→ 0F72 ཨ tibetan vowel sign i
- A854** ཨ **HPHAGS-PA LETTER O**  
→ 0F7C ཨ tibetan vowel sign o
- A855** ཨ **HPHAGS-PA LETTER U**  
→ 0F74 ཨ tibetan vowel sign u

- A856** ཨ **HPHAGS-PA LETTER OE**  
≡ 0911 ཨ devanagari candra o
- A857** ཨ **HPHAGS-PA LETTER UE**
- A858** ཨ **HPHAGS-PA LETTER KA**  
→ 0F40 ཨ tibetan letter ka
- A859** ཨ **HPHAGS-PA LETTER GA**
- A85A** ཨ **HPHAGS-PA LETTER KHA**
- A85B** ཨ **HPHAGS-PA LETTER NGA**
- A85C** ཨ **HPHAGS-PA LETTER HAN CA**  
→ 0F45 ཨ tibetan letter ca
- A85D** ཨ **HPHAGS-PA LETTER CHA**  
→ 0F46 ཨ tibetan letter cha
- A85E** ཨ **HPHAGS-PA LETTER JA**  
→ 0F47 ཨ tibetan letter ja
- A85F** ཨ **HPHAGS-PA LETTER HAN NYA**  
→ 0F49 ཨ tibetan letter nya
- A860** ཨ **HPHAGS-PA LETTER TA**
- A861** ཨ **HPHAGS-PA LETTER THA**  
→ 0F50 ཨ tibetan letter tha
- A862** ཨ **HPHAGS-PA LETTER DA**  
→ 0F51 ཨ tibetan letter da
- A863** ཨ **HPHAGS-PA LETTER NA**  
→ 0F53 ཨ tibetan letter na
- A864** ཨ **HPHAGS-PA LETTER BA**  
→ 0F56 ཨ tibetan letter ba
- A865** ཨ **HPHAGS-PA LETTER HAN PHA**
- A866** ཨ **HPHAGS-PA LETTER PA**  
→ 0F54 ཨ tibetan letter pa
- A867** ཨ **HPHAGS-PA LETTER MA**  
→ 0F58 ཨ tibetan letter ma
- A868** ཨ **HPHAGS-PA LETTER HAN TSA**  
→ 091E ཨ devanagari letter nya

**A869**

- A869 འ HPHAGS-PA LETTER HAN TSHA  
→ 091C ञ devanagari letter ja
- A86A འ HPHAGS-PA LETTER HAN DZA
- A86B འ HPHAGS-PA LETTER HAN WA
- A86C འ HPHAGS-PA LETTER HAN ZHA  
→ 0F5E འ tibetan letter zha
- A86D འ HPHAGS-PA LETTER ZA  
→ 0F5F འ tibetan letter za
- A86E འ HPHAGS-PA LETTER MINUSCULE A  
→ 0F60 འ tibetan letter -a
- A86F འ HPHAGS-PA LETTER YA  
→ 0F61 འ tibetan letter ya
- A870 འ HPHAGS-PA LETTER RA  
→ 0F62 འ tibetan letter ra
- A871 འ HPHAGS-PA LETTER LA  
→ 0F63 འ tibetan letter la
- A872 འ HPHAGS-PA LETTER SHA  
→ 0F64 འ tibetan letter sha
- A873 འ HPHAGS-PA LETTER SA  
→ 0F66 འ tibetan letter sa
- A874 འ HPHAGS-PA LETTER HA  
→ 0F67 འ tibetan letter ha
- A875 འ HPHAGS-PA LETTER QHA  
→ 0F41 འ tibetan letter kha
- A876 འ HPHAGS-PA LETTER HAN QWA
- A877 འ HPHAGS-PA LETTER HAN FA
- A878 འ HPHAGS-PA LETTER QA  
→ 0F42 འ tibetan letter ga
- A879 འ HPHAGS-PA LETTER HAN HALF  
U  
→ 18A6 འ mongolian letter ag half u  
→ 0FAD འ tibetan subjoined letter wa
- A87A འ HPHAGS-PA LETTER HAN HALF  
YA

**HPHAGS-PA**

- 18A7 འ mongolian letter ag half ya  
→ 0FB1 འ tibetan subjoined letter ya
- A87B འ HPHAGS-PA LETTER SANSKRIT  
TTA
- A87C འ HPHAGS-PA LETTER SANSKRIT  
TTHA  
→ 0F4B འ tibetan letter ttha
- A87D འ HPHAGS-PA LETTER SANSKRIT  
DDA  
→ 0F4C འ tibetan letter dda
- A87E འ HPHAGS-PA LETTER SANSKRIT  
NNA  
→ 0F4E འ tibetan letter nna
- A87F འ HPHAGS-PA LETTER HAN YA  
≡ 0F61 འ tibetan letter ya
- A880 འ HPHAGS-PA LETTER HAN SHA  
→ 0F64 འ tibetan letter sha
- A881 འ HPHAGS-PA LETTER HAN HA  
≡ 0F67 འ tibetan letter ha
- A882 འ HPHAGS-PA LETTER HAN FHA
- A883 (This position shall not be used)
- A884 (This position shall not be used)
- A885 (This position shall not be used)
- A886 (This position shall not be used)
- A887 (This position shall not be used)
- A888 (This position shall not be used)
- A889 (This position shall not be used)
- A88A (This position shall not be used)
- A88B (This position shall not be used)
- A88C (This position shall not be used)
- A88D (This position shall not be used)
- A88E (This position shall not be used)
- A88F (This position shall not be used)

**A88F**

### III Variant Presentation Glyphs and Their Names in HPags-pa Script

|   | 000 | 001 | 002 | 003 | 004 | 005 |
|---|-----|-----|-----|-----|-----|-----|
| 0 | '   | ᳚   | ᳛   | ᳜   | ᳝   | ᳞   |
| 1 | ᳟   | ᳠   | ᳡   | ᳢   | ᳣   | ᳤   |
| 2 | ᳥   | ᳦   | ᳧   | ᳨   | ᳩ   | ᳪ   |
| 3 | ᳫ   | ᳬ   | ᳭   | ᳮ   | ᳯ   | ᳰ   |
| 4 | ᳱ   | ᳲ   | ᳳ   | ᳴   | ᳵ   | ᳶ   |
| 5 | ᳷   | ᳸   | ᳹   | ᳺ   | ᳻   | ᳼   |
| 6 | ᳽   | ᳾   | ᳿   | ᳠   | ᳡   | ᳢   |
| 7 | ᳣   | ᳤   | ᳥   | ᳦   | ᳧   | ᳨   |
| 8 | ᳩ   | ᳪ   | ᳫ   | ᳬ   | ᳭   | ᳮ   |
| 9 | ᳯ   | ᳰ   | ᳱ   | ᳲ   | ᳳ   | ᳴   |
| A | ᳵ   | ᳶ   | ᳷   | ᳸   | ᳹   | ᳺ   |
| B | ᳻   | ᳼   | ᳽   | ᳾   | ᳿   |     |
| C | ᳠   | ᳡   | ᳢   | ᳣   | ᳤   |     |
| D | ᳥   | ᳦   | ᳧   | ᳨   | ᳩ   |     |
| E | ᳪ   | ᳫ   | ᳬ   | ᳭   | ᳮ   |     |
| F | ᳯ   | ᳰ   | ᳱ   | ᳲ   | ᳳ   |     |

## 0000

## HPHAGS-PA

## 0038

|      |                              |                                      |      |                              |
|------|------------------------------|--------------------------------------|------|------------------------------|
| 0000 | '                            | hpha <sup>1</sup> . left joiner      |      |                              |
| 0001 | ཨ                            | hphal. a initial form                | 001E | ཨཱ                           |
| 0002 | ཨཱ                           | hphal. e medial form                 | 001F | ཨཱཱ                          |
| 0003 | ཨཱཱ                          | hphal. ee second isolate form        |      |                              |
| 0004 | ཨཱཱཱ                         | hphal. ee first initial form         | 0020 | ཨཱཱཱ                         |
| 0005 | ཨཱཱཱཱ                        | hphal. ee second initial form        | 0021 | ཨཱཱཱཱ                        |
| 0006 | ཨཱཱཱཱཱ                       | hphal. ee third initial form         | 0022 | ཨཱཱཱཱཱ                       |
| 0007 | ཨཱཱཱཱཱཱ                      | hphal. ee first medial form          | 0023 | ཨཱཱཱཱཱཱ                      |
| 0008 | ཨཱཱཱཱཱཱཱ                     | hphal. ee second medial form         | 0024 | ཨཱཱཱཱཱཱཱ                     |
| 0009 | ཨཱཱཱཱཱཱཱཱ                    | hphal. ee first final form           | 0025 | ཨཱཱཱཱཱཱཱཱ                    |
| 000A | ཨཱཱཱཱཱཱཱཱཱ                   | hphal. ee second final form          | 0026 | ཨཱཱཱཱཱཱཱཱཱ                   |
| 000B | ཨཱཱཱཱཱཱཱཱཱཱ                  | hphal. ee first reversed final form  | 0027 | ཨཱཱཱཱཱཱཱཱཱཱ                  |
| 000C | ཨཱཱཱཱཱཱཱཱཱཱཱ                 | hphal. ee second reversed final form | 0028 | ཨཱཱཱཱཱཱཱཱཱཱཱ                 |
| 000D | ཨཱཱཱཱཱཱཱཱཱཱཱཱ                | hphal. i initial form                | 0029 | ཨཱཱཱཱཱཱཱཱཱཱཱཱ                |
| 000E | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱ               | hphal. i medial form                 | 002A | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱ               |
| 000F | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱ              | hphal. i final form                  | 002B | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱ              |
| 0010 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ             | hphal. i reversed final form         | 002C | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ             |
| 0011 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ            | hphal. o first initial form          | 002D | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ            |
| 0012 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ           | hphal. o second initial form         | 002E | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ           |
| 0013 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ          | hphal. o medial form                 | 002F | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ          |
| 0014 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ         | hphal. o final form                  | 0030 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ         |
| 0015 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ        | hphal. u first initial form          | 0031 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ        |
| 0016 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ       | hphal. u second initial form         | 0032 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ       |
| 0017 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ      | hphal. u third initial form          | 0033 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ      |
| 0018 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ     | hphal. u medial form                 | 0034 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ     |
| 0019 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ    | hphal. u final form                  | 0035 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ    |
| 001A | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ   | hphal. u reversed final form         | 0036 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ   |
| 001B | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ  | hphal. oe initial form               | 0037 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ  |
| 001C | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ  | hphal. oe first medial form          | 0038 | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ |
| 001D | ཨཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱཱ | hphal. oe first final form           |      |                              |

0039

HPHAGS-PA

005F

0039 ऀ hphal. minuscule a initial-medial form

003A ँ hphal. minuscule a reversed initial-medial form

003B ए hphal. ya initial-medial form

003C ऎ hphal. ra first initial-medial form

003D ए hphal. ra second initial form

003E ऒ hphal. ra second medial form

003F ओ hphal. ra second final form

0040 ऌ hphal. la initial-medial form

0041 ऍ hphal. sha initial-medial form

0042 आ hphal. sa initial-medial form

0043 इ hphal. ha initial-medial form

0044 ई hphal. ha reversed medial form

0045 उ hphal. ha reversed final form

0046 ऊ hphal. qha initial-medial form

0047 ऋ hphal. han qwa initial-medial form

0048 ॠ hphal. han fa initial-medial form

0049 ॡ hphal. qa initial-medial form

004A ॢ hphal. han half u initial form

004B ॣ hphal. han half u medial form

004C । hphal. han half u final form

004D ॥ hphal. han half u reversed final form

004E ० hphal. han half ya first medial form

004F १ hphal. han half ya second medial form

0050 २ hphal. han half ya second final form

0051 ३ hphal. han half ya reversed final form

0052 ४ hphal. sanskrit tta initial-medial form

0053 ५ hphal. sanakrit ttha first initial-medial form

0054 ६ hphal. sanakrit ttha second initial-medial form

0055 ७ hphal. sanakrit dda initial-medial form

0056 ८ hphal. sanakrit nna initial-medial form

0057 ९ hphal. han ya initial-medial form

0058 १० hphal. han sha initial-medial form

0059 ११ hphal. han ha initial-medial form

005A १२ hphal. han fha initial-medial form

005B (This position shall not be used)

005C (This position shall not be used)

005D (This position shall not be used)

005E (This position shall not be used)

005F (This position shall not be used)

hpha. = hphags-pa

hphal. = hphags-pa letter



Reference Table

| BASIC CHARACTERS |                |                     | PRESENTATION CHARACTERS |                |                                      |                   |
|------------------|----------------|---------------------|-------------------------|----------------|--------------------------------------|-------------------|
| №                | GRAPHIC SYMBOL | NAME                | №                       | GRAPHIC SYMBOL | NAME                                 | PRESENTATION RULE |
| A844             | '              | <b>HPHA. JOINER</b> | 000                     |                | (right joiner)                       | '                 |
|                  |                |                     | 001                     | '              | hpha. left joiner                    | ' [VS1]           |
| A852             | 𑌃              | <b>HPHAL. EE</b>    | 000                     |                | (first isolate form)                 | 𑌃                 |
|                  |                |                     | 001                     | 𑌃              | hphal. ee second isolate form        | 𑌃 [VS1]           |
|                  |                |                     | 002                     | 𑌃              | hphal. ee first initial form         | 𑌃 [ZW]            |
|                  |                |                     | 003                     | 𑌃              | hphal. ee second initial form        | 𑌃 [ZW] [VS1]      |
|                  |                |                     | 004                     | 𑌃              | hphal. ee third initial form         | 𑌃 [ZW] [VS2]      |
|                  |                |                     | 005                     | 𑌃              | hphal. ee first medial form          | [ZW] 𑌃 [ZW]       |
|                  |                |                     | 006                     | 𑌃              | hphal. ee second medial form         | [ZW] 𑌃 [ZW] [VS1] |
|                  |                |                     | 007                     | 𑌃              | hphal. ee first final form           | [ZW] 𑌃            |
|                  |                |                     | 008                     | 𑌃              | hphal. ee second final form          | [ZW] 𑌃 [VS1]      |
|                  |                |                     | 009                     | 𑌃              | hphal. ee first reversed final form  | [ZW] 𑌃 ([VS2])    |
|                  |                |                     | 00A                     | 𑌃              | hphal. ee second reversed final form | [ZW] 𑌃 ([VS3])    |
| A853             | 𑌄              | <b>HPHAL. I</b>     | 000                     |                | (isolate form)                       | 𑌄                 |
|                  |                |                     | 001                     | 𑌄              | hphal. i initial form                | 𑌄 [ZW]            |
|                  |                |                     | 002                     | 𑌄              | hphal. i medial form                 | [ZW] 𑌄 [ZW]       |
|                  |                |                     | 003                     | 𑌄              | hphal. I final form                  | [ZW] 𑌄            |
|                  |                |                     | 004                     | 𑌄              | hphal. i reversed final form         | [ZW] 𑌄 ([VS1])    |
| A854             | 𑌅              | <b>HPHAL. O</b>     | 000                     |                | (first isolate form)                 | 𑌅                 |
|                  |                |                     | 001                     | 𑌅              | hphal. o first initial form          | 𑌅 [ZW]            |
|                  |                |                     | 002                     | 𑌅              | hphal. o second initial form         | 𑌅 [ZW] [VS1]      |

| BASIC CHARACTERS |                |           | PRESENTATION CHARACTERS |                |                              |   |
|------------------|----------------|-----------|-------------------------|----------------|------------------------------|---|
| No               | GRAPHIC SYMBOL | NAME      | No                      | GRAPHIC SYMBOL | NAME                         | PRESENTATION RULE   |
|                  |                |           | 003                     | ↗              | hphal. o medial form         |  ↗    |
|                  |                |           | 004                     | ↘              | hphal. o final form          |  ↘   |
| A855             | ଉ              | HPHAL. U  | 000                     |                | (first isolate form)         | ଉ   |
|                  |                |           | 002                     | ଉ              | hphal. u first initial form  | ଉ    |
|                  |                |           | 003                     | ଉ              | hphal. u second initial form | ଉ     |
|                  |                |           | 004                     | ଉ              | hphal. u third initial form  | ଉ     |
|                  |                |           | 005                     | ଉ              | hphal. u medial form         |  ଉ    |
|                  |                |           | 005                     | ଉ              | hphal. u final form          |  ଉ   |
|                  |                |           | 006                     | ଉ              | hphal. u reversed final form |  ଉ    |
| A856             | ଌ              | HPHAL. OE | 000                     |                | (isolate form)               | ଌ   |
|                  |                |           | 001                     | ଌ              | hphal. oe initial form       | ଌ    |
|                  |                |           | 002                     | ଌ              | hphal. oe first medial form  |  ଌ    |
|                  |                |           | 003                     | ↗              | hphal. oe second medial form |  ଌ   |
|                  |                |           | 004                     | ଌ              | hphal. oe first final form   |  ଌ   |
|                  |                |           | 005                     | ↘              | hphal. oe second final form  |  ଌ    |
| A857             | ଐ              | HPHAL. UE | 000                     |                | (isolate form)               | ଐ   |
|                  |                |           | 001                     | ଐ              | hphal. ue initial form       | ଐ    |
|                  |                |           | 002                     | ଐ              | hphal. ue first medial form  |  ଐ    |
|                  |                |           | 003                     | ଐ              | hphal. ue second medial form |  ଐ   |
|                  |                |           | 004                     | ଐ              | hphal. ue first final form   |  ଐ   |

| BASIC CHARACTERS |                |                  | PRESENTATION CHARACTERS |                |  |   |
|------------------|----------------|------------------|-------------------------|----------------|--|---|
| No               | GRAPHIC SYMBOL | NAME             | No                      | GRAPHIC SYMBOL | NAME   | PRESENTATION RULE   |
|                  |                |                  | 005                     | ৗ              | hphal. ue second final form                    |               |
| A86E             | ৗ              | HPHAL. MINUSCULA | 000                     |                | (isolate-final form)                           | ৗ   |
|                  |                |                  | 001                     | ৗ              | hphal. minuscul a initial-medial form          | ৗ    |
|                  |                |                  | 002                     | ৗ              | hphal. minuscul a reversed initial-medial form | ৗ  (VS1)   |
| A86B             | ৗ              | HPHAL. HAN WA    | 000                     |                | (first isolate-final form)                     | ৗ   |
|                  |                |                  | 001                     | ৗ              | hphal. han wa second isolate-final form        | ৗ    |
|                  |                |                  | 002                     | ৗ              | hphal. han wa first initial-medial form        | ৗ    |
|                  |                |                  | 003                     | ৗ              | hphal. han wa second initial-medial form       | ৗ         |
| A870             | ৗ              | HPHAL. RA        | 000                     |                | (first isolate-final form)                     | ৗ   |
|                  |                |                  | 001                     | ৗ              | hphal. ra first initial-medial form            | ৗ    |
|                  |                |                  | 002                     | ৗ              | hphal. ra second initial form                  | ৗ         |
|                  |                |                  | 003                     | ৗ              | hphal. ra second medial form                   |  ৗ   |
|                  |                |                  | 004                     | ৗ              | hphal. ra second final form                    |  ৗ        |
| A874             | ৗ              | HPHAL. HA        | 000                     |                | ( isolate-final form)                          | ৗ   |
|                  |                |                  | 001                     | ৗ              | hphal. ha initial-medial form                  | ৗ    |
|                  |                |                  | 002                     | ৗ              | hphal. ha reversed medial form                 |  ৗ  (VS1) |
|                  |                |                  | 003                     | ৗ              | hphal. ha reversed final form                  |  ৗ (VS1)   |

| BASIC CHARACTERS |                |                      | PRESENTATION CHARACTERS |                |   |                   |
|------------------|----------------|----------------------|-------------------------|----------------|---|-------------------|
| №                | GRAPHIC SYMBOL | NAME                 | №                       | GRAPHIC SYMBOL | NAME  | PRESENTATION RULE |
| A879             | 𑀅              | HPHAL. HAN HALF U    | 000                     |                | (final form)                                    | 𑀅                 |
|                  |                |                      | 001                     | 𑀅              | hphal. han half u initial form                  | 𑀅 [ZW]            |
|                  |                |                      | 002                     | 𑀅              | hphal. han half u medial form                   | [ZW] 𑀅 [ZW]       |
|                  |                |                      | 003                     | 𑀅              | hphal. han half u final form                    | [ZW] 𑀅            |
|                  |                |                      | 004                     | 𑀅              | hphal. han half u reversed final form           | [ZW] 𑀅 (VS1)      |
| A87A             | 𑀆              | HPHAL. HAN HALF YA   | 000                     |                | ( first final form)                             | 𑀆                 |
|                  |                |                      | 001                     | 𑀆              | hphal. han half ya first medial form            | [ZW] 𑀆 [ZW]       |
|                  |                |                      | 002                     | 𑀆              | hphal. han half ya second medial form           | [ZW] 𑀆 [ZW] (VS1) |
|                  |                |                      | 003                     | 𑀆              | hphal. han half ya second final form            | [ZW] 𑀆 (VS1)      |
|                  |                |                      | 004                     | 𑀆              | hphal. han half ya reversed final form          | [ZW] 𑀆 (VS2)      |
| A87C             | 𑀇              | HPHAL. SANSKRIT TTHA | 000                     |                | ( isolate-final form)                           | 𑀇                 |
|                  |                |                      | 001                     | 𑀇              | hphal. sanskrit ttha first initial-medial form  | 𑀇 [ZW]            |
|                  |                |                      | 002                     | 𑀇              | hphal. sanskrit ttha second initial-medial form | 𑀇 [ZW] [VS]       |