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SINHALA CHARACTER CODE FOR INFORMATION INTERCHANGE

PART 2 : REQUIREMENTS AND METHODS OF TEST

SRI LANKA STANDARDS INSTITUTION

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SLS 1134 : PART 2 : 2007

Gr. 7

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Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This standard does not purport to include all the necessary provisions of a contract.

SRI LANKA STANDARD
SINHALA CHARACTER CODE FOR INFORMATION INTERCHANGE
PART 2 : REQUIREMENTS AND METHODS OF TEST

FOREWORD

This standard was approved by the Sectoral Committee on Information Technology and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2007 – 02 – 27.

This part of the standard prescribes methods of test to ascertain conformity of Sinhala support software with or without Keyboard, Fonts, Computer systems preloaded with Sinhala, Application software, and Web Sites, to Sinhala Unicode specified in SLS 1134. The fonts are standardized in three different levels based on the usage of different applications, to determine conformity to SLS 1134 Sinhala Unicode .

In the preparation of this standard, the assistance provided by the Information and Communication Technology Agency of Sri Lanka (ICTA) is gratefully acknowledged.

SRI LANKA STANDARD
SINHALA CHARACTER CODE FOR INFORMATION INTERCHANGE
PART 2 : REQUIREMENTS AND METHODS OF TEST

1 SCOPE

This standard prescribes requirements and methods of test for following products to ascertain conformity to **SLS 1134 : 2004**.

a) Sinhala support software with or without keyboard
b) Fonts
c) Computer systems preloaded with Sinhala
d) Application software
e) Web sites

2 REFERENCES

SLS 1134 : Sinhala Character Code for Information Interchange

3 DEFINITIONS

Definitions given in **SLS 1134 : 2004** shall apply for the purpose of this part of the standard.

4 PRODUCTS AND COMPONENTS

4.1 Sinhala Support Software with or without Keyboard

Sinhala support software should contain the following:

a) keyboard driver;
b) display driver;
c) printer driver; and
d) at least one Sinhala font.

By enabling/installing the Sinhala support software in the computer, the user should be able to input, view and process Sinhala characters on the computer. The Sinhala support software can be supplied with or without a keyboard. If a keyboard is provided, it shall have the configurations given in **4.1.2** and shall be tested as described in **6.2.1**.

4.1.1 *Keyboard Driver*

The keyboard driver shall be provided with the Sinhala support software. It shall be capable of inputting all Sinhala letters and shall support the standard Sinhala keyboard layout, input sequence and generated codes specified in **SLS 1134**. It may optionally support other keyboard layouts, e.g. Phonetic. However the default layout shall be as specified in **SLS 1134**.

4.1.2 *Keyboard*

4.1.2.1 Layout
The layout of the keyboard shall be as specified in **SLS 1134**. Special keys may be defined to perform the following tasks:

i) The sanyakaya key may be used to generate "sanyaka" letters such as ඟ, ඬ and ඳ in conjunction with letters such as ග, ඩ and ද.

ii) The join key is used to join two letters to form conjunct letters such as ඤ.

The touch key is used to bring two letters together to form touching letters, e.g., සෟ The inv key is used to produce a non-breaking space which may be used to show signs in isolation.
Alternative symbols for "Sinhala vowel sign keti paa-pilla ", "Sinhala vowel sign diga paa-pilla" and "sign al-lakuna" may also be printed on the relevant keys.

4.1.2.2 Visibility of Symbols

The symbols printed on each key shall be clearly visible under normal office lighting conditions. They shall be clearly and permanently printed. The keyboard shall be comfortable to the user.

NOTE: *Keyboard may also contain other language characters. e.g. Tamil or English.*

4.1.3 *Display/Printer Driver*
These drivers should support for clear smooth display of Sinhala Unicode characters to the screen and printer respectively.

4.2 Fonts
The fonts are standardized in 3 different levels. A Level **1** font provides basic Sinhala support, and higher levels support more advanced features.

4.2.1 Level 1 Fonts:

Usage: Level **1** fonts are intended to be used in day-to-day applications, such as e-mail, chat, etc.

A font supporting **SLS 1134** at Level **1** shall represent all the following Sinhala letters.
a) Vowels
අ, ආ, ඇ, ඈ, ඉ, ඊ, උ, ඌ, ඍ, ඎ, එ, ඒ, ඓ, ඔ, ඕ, ඖ, ං, ඃ,

b) Consonants
ක, ඛ, ග, ඝ, ඞ ඟ,
ච, ඡ, ජ, ඣ, ඤ, ඥ, ඦ,
ට, ඨ, ඩ, ඪ, ණ, ඬ,

ත, ථ, ද, ධ, න, ඳ,
ප, ඵ, බ, භ, ම, ඹ,
ය, ර, ල, ව, ශ, ෂ, ස, හ, ළ, ෆ,

c) and Sinhala Characters given in Table **1.**

All combinations of the above consonants with the above vowels shall be supported. Consonant-vowel combinations with the *yansaya*(යංශය) *rakaransaya* (රකාරාංශය) and *repaya* shall also be supported.

NOTE: *Not all of the above combinations are valid in Sinhala text. Invalid combinations may be supported with lower aesthetic quality.*

A Level **1** font should support the ක්‍ෂ (ksha) conjunct, and may optionally contain other conjunct letters.

4.2.2 Level 2 Fonts:
Usage: Level 2 fonts are intended for general applications such as documents, books, etc.

Features: A Level **2** font shall have all the features of Level **1** font. Additionally, it shall support existing combination of Sinhala consonants with 'Repaya'. However, the combination of repaya with "Sinhala ispilla" is optional. It should support the 11 conjunct letters given below and their combinations with strokes as well. The letter 'ඥ' should also be supported.

Conjunct Letters
ක්‍ෂ, ක්‍ව, ත්‍ථ, ත්‍ව, න්‍ථ, න්‍ද, න්‍ධ, න්‍ව, ද්‍ධ, ද්‍ව, ට්‍ඨ

4.2.3 Level 3 Fonts
Usage: Level **3** fonts are intended for advanced publications and printing applications, especially for supporting Pali and Sanskrit text written in Sinhala script, and historical documents.

Features: In addition to the features of Level **1** & Level **2** this font should posses following features.

The Sinhala characters ඏ and ඐ should be supported.

Should support all combinations of strokes with conjuncts including repaya + Sinhala ispilla combination.

Following commonly used *touching letters* should be included.
ස්ස ම්ම බ්ද ත්ත න්ත ස්ව
The developer may implement additional touching letters. He should provide a list of touching letters which the font supports for testing purposes.

4.3 Computer Systems preloaded with Sinhala

When a vendor provides the entire computer system preloaded with Sinhala, the user shall be able to work with Sinhala Unicode, without installing any third party component in the computer system. At a minimum the following components shall be provided with the computer system:

a) Sinhala Display and printer driver
b) Sinhala Keyboard and keyboard driver
c) One Sinhala font

This system shall support Unicode-aware applications running in Sinhala. The three components listed above shall have the specifications described under section **4.1** and **4.2**.

4.4 Application Software

Application Software shall support the use of Sinhala for a particular application. An application should work correctly with keyboards, fonts and drivers as specified in **4.1** to **4.3**. A user shall be able to input Sinhala Unicode text to the application through the standard input devices (e.g. keyboard), process data and obtain Sinhala Unicode text as output through the standard output devices such as display units and printers. The output shall be compatible to use as input for another Sinhala Unicode compatible applications and vise versa.

4.5 Web Sites

A web site developed according to the standard should be viewable to the user using any Unicode compatible web browser with Sinhala support without installing a proprietary font type. If the web site has any on-line data input functionalities, it shall support Unicode input as well. The contents shall be tested for conformity to Unicode standards as well as the **SLS 1134 : 2004.**

5. MARKING

5.1 Each product of the categories specified in **4.1, 4.2** and **4.4** shall be marked/ labelled with the following. The marking/labelling should be on the product. If the product is software, the labelling can be done on the storage media in which the product is stored (e.g. CD, Diskette).

a) The name of the trademark of the manufacturer or responsible vendor.
b) Model/Version number.
   e.g. Model number for keyboard, version number of a software
c) Level of fonts

SLS product certification mark given in Figure **1** shall be used to indicate the conformity to SLS **1134**.

If the product belongs to category **4.3**, the marking shall be on the product and/or package along with the product certification mark. The product certification mark shall be displayed in web sites which are complying with this standard.

Figure 1 – SLS product certification mark for certified products

5.2 Marking shall be legible and durable. Conformity shall be checked by rubbing the marking, lightly 10 times, with a piece if cotton or cloth soaked in water. Information shall be supplied with the product.

6 METHODS OF TEST

6.1 Installation/Un-installation of Package/Software

6.1.1 *Installing Sinhala Support / Application Software*

The Sinhala support/application software should be installed in a computer which complies with the pre-requirements. The vendor should defined the pre-requirements (e.g. Operating system, Memory, special drivers etc.) needed for the software. The computer should not have any previous installation of Sinhala Unicode software or any components thereof.

The installation process shall be started automatically or manually and should install all required components. The installation process should finish within a reasonable time period. The installation process should be simple and should be usable even by a non-computer professional. It should not adversely affect any other software/packages or peripherals. The font/ keyboard / printer-driver/ display driver installations may be included as sub processes of the main application installation or they may be installed separately as described in **6.1.2** and **6.1.3**.

6.1.2 *Installing Fonts*

The user should be able to select the fonts to install to the system. The installation process should install the selected fonts.

6.1.3 *Installing Keyboard / Printer / Display driver*
The driver installation process should install the relevant driver in the system and should not affect the existing keyboard/printer/display drivers/functionalities. The installation process should be simple and shall have automated installation/configuration capabilities to avoid user involvement in complex configurations and settings.

6.1.4 *Un-Installation Process*

Un-installation process should be provided with Sinhala support/application software which supports a fully automated un-installation process. After un-installing the software the computer should revert to its previous configuration and the user shall be able to use the system without any inconvenience. Un-installation process shall be checked using a suitable configuration management tool.

6.2 System Functionalities

6.2.1 *Keyboard*

The layout and the character symbols of the keyboard shall conform to the standard keyboard layout given in **SLS 1134**. The Sinhala symbols shall be clearly and permanently printed on the relevant keys in the keyboard.

6.2.2 *Keyboard Driver*

The keyboard driver shall support typing all Sinhala letters. The key sequences given in Table **1** shall be used as test cases. The correct Unicode sequence and display should be observed. The driver shall also be tested with other key sequences as decided by the testing authority.

TABLE 1 - Test cases for Keyboard drivers

Key sequence	Unicode Sequence	Display appearance
Vowels අ	0D85	අ
අ + ා	0D86	ආ
අ + ැ	0D87	ඇ
අ + ෑ	0D88	ඈ
ඉ	0D89	ඉ
ඊ	0D8A	ඊ
උ	0D8B	උ
උ + ූ	0D8C	ඌ
ඍ	0D8D	ඍ
ඍ + ෘ	0D8E	ඎ
ඏ	0D91	ඏ
ඏ + ්	0D92	ඐ
ඔ + ඏ	0D93	ඔඏ
ඕ	0D94	ඕ
ඕ + ්	0D95	ඖ
ඖ + ූ	0D96	ඖූ

Table 1 (Continued)

Consonants All the consonants shall be tested		
Constants with strokes		
ළ + ු	0DC5 0DD6	ළූ
ර + ැ	0DBB 0DD0	ර්‍ය
ර + ු	0DBB 0DD4	රු
ව + ්	0DC0 0DCA	ව්
ග + ු	0D9C 0DD4	ගු
ත + ු	0DAD 0DD4	තු
ද + ු	0DAF 0DD4	දු
ක+ා	0D9A 0DCF	කා
ක+ ැ	0D9A 0DD0	කැ
ක+ ෑ	0D9A 0DD1	කෑ
ක+ ි	0D9A 0DD2	කි
ක+ී	0D9A 0DD3	කී
ක+ු	0D9A 0DD4	කු
ක+ූ	0D9A 0DD5	කූ
ක + ෘ	0D9A 0DD8	කෘ
ක + ෘ + ෘ	0D9A 0DF2	කෲ
ෙ+ක	0D9A 0DD9	කෙ
ෙ+ක+්	0D9A 0DDA	කේ
ෙ+ෙ+ක	0D9A 0DDB	කෛ
ෙ+ක+ා	0D9A 0DDC	කො
ෙ+ක+ා+්	0D9A 0DDD	කෝ
ෙ+ක+ෟ	0D9A 0DDE	කෟ
Combination of the consonant. (ක) with vocalic and non-vocalic strokes		
ක + ්‍ය	0D9A 0DCA 200D 0DBA	ක්‍ය
ක + ්‍ය + ා	0D9A 0DCA 200D 0DBA0DCF	ක්‍යා
ක + ්‍ය + ු	0D9A 0DCA 200D 0DBA0DD4	ක්‍යු
ක + ්‍ය + ූ	0D9A 0DCA 200D 0DBA0DD6	ක්‍යූ
ෙ+ ක + ්‍ය	0D9A 0DCA 200D 0DBA0DD9	කෙය
ෙ+ ක + ්‍ය + ්	0D9A 0DCA 200D 0DBA0DDA	කෙය්
ෙ+ ක + ්‍ය + ා	0D9A 0DCA 200D 0DBA0DDC	කෙයා
ෙ+ ක + ්‍ය + ා + ්	0D9A 0DCA 200D 0DBA0DDD	කෙයා්
ක + ්	0D9A 0DCA 200D 0DBB	ක්
ක + ් + ා	0D9A 0DCA 200D 0DBB 0DCF	ක්‍රා
ක + ් + ැ	0D9A 0DCA 200D 0DBB 0DD0	ක්‍රැ

Table 1 (Concluded)

ක + ්‍ර + ෑ	0D9A 0DCA 200D 0DBB 0DD1	ක්‍රෑ
ක + ්‍ර + ී	0D9A 0DCA 200D 0DBB 0DD2	ක්‍රී
ක + ්‍ර + ී	0D9A 0DCA 200D 0DBB 0DD3	ක්‍රී
ෙ+ක + ්‍ර	0D9A 0DCA 200D 0DBB 0DD9	ක්‍රෙ
ෙ+ක + ්‍ර + ්	0D9A 0DCA 200D 0DBB0DDA	ක්‍රේ
ෙ+ ක + ්‍ර + ා	0D9A 0DCA 200D 0DBB0DDC	ක්‍රෝ
ෙ+ ක + ්‍ර + ා + ්	0D9A 0DCA 200D 0DBB0DDD	ක්‍රෝ

The above example shows the sequence with the consonant ක, but the testing will be carried out with randomly selected consonants. The key sequences shall be on the principle "type as you write". The user should be able to produce a particular Sinhala term correctly by typing the symbols in the order they are normally written by hand. This typing order may be different from the encoding sequence or the display order. The backspace key and delete key should be configured to delete text. The deleting order could be decided by the developer as required and the testing authority shall be informed of the same.

Test cases given in Table **2** shall be used to check the proper functionality of the keyboard driver and the display driver. The user should be able to observe the given Sinhala terms properly, by typing the letters of the terms in the given input sequence. The driver should also be tested with other key sequences.

TABLE 2 - Test cases for Keyboard driver and display driver

Description	Input Sequence	Display appearance
Check the correctness of the Vocalic strokes ෙ (kombuwa),ෟ (gayanu kiththa) and ී (diga is-pilla)	ෙ + ග + ෟ + ර + ව + න + ී + ය	ගෞරවනීය
ී (diga is-pilla) , ් (al-lakuna) and ා (aela-pilla)	ස + ී + ද + ් + ධ + ා + ර + ් + ථ.	සිද්ධාර්ථ
Displaying the ්‍ර (pa pilla) in different ways ෘ (gaetta-pilla)	ග + ්‍ර + ර + ්‍ර + ග + ෑ + ට + ළ + ්‍ර ක + ක + ෘ	ගුරු ගැටළු කතෘ
Check the correctness of the Non-Vocalic stroke i.ා (yansaya) and ෘ (repaya) ii. ්‍ර (rakaranshaya)	අ + ා + ය + ෘ + ා ද + ්‍ර + ව + ී + ඩ	i. ආර්‍ය ii. ද්‍රවිඩ

Table 2 (Concluded)

"sanyaka" Letters ඳ,ඬ,ඟ	ඬගදෙ (after 'sanyaka' key)	ඬඟදෙ
Conjunct letters	දෙ + කා + Joint key + ෂ ව + නා + Joint key + දෙ	දෙක්ෂ වන්දෙ
Touching letters	ස + touch + ස	

6.2.3 *Display and printing*

The display and printing of Sinhala fonts shall be clear and accurate. Inter-letter spacing shall conform to established Sinhala usage. The test cases given in Table **3** shall be used to check the accurate display of Sinhala text. The driver shall also be tested with other character sequences.

TABLE 3 - Display accuracy

Font size **10**	Font size **12**	Font size **14**	Font size **16**
දුර්වළුණි	දුර්වළුණි	දුර්වළුණි	දුර්වළුණි
පක්ෂ	පක්ෂ	පක්ෂ	පක්ෂ
සඳහා	සඳහා	සඳහා	සඳහා

6.2.4 *Compatibility with other Standard Software*

Sinhala software shall be able to accept and process the output generated by other Unicode-compliant systems. i.e. The user shall be able to load/import Sinhala Unicode text from other applications and observe the correct output. The user shall also be able to export text generated by the system as an input to another Unicode compliant application.

6.3 Web Sites

The contents of the testing web site should be viewable using a Unicode compatible web browser without the installation of any other additional software. The content shall be tested for Unicode errors using appropriate tools by the testing authority.

6.4 Fonts

All font types shall be tested with Test Case **I** shown in Appendix **A**. A font type which require Level **2** status, shall be tested with both test Case **I** and test Case **II**, and it should represent conjunct letters as well as Sinhala 'repaya' (◌්ර) correctly. All the conjunct letters shall be tested for their availability and display accuracy.

Similarly, the font type requesting 'Level **3** status should be tested with Test Case **I**, Test Case **II** and Test Case **III**.

APPENDIX A

A.1 TEST CASE 1: FOR ALL FONT TYPES

ගතවූ අඩ සිය වසක කාලය තුළ දී, අන්තර්ජාතික සංනිවේදන මාධ්‍යයක් වශයෙන් ඉංග්‍රීසි බසට හිමි ස්ථානය ස්ථාපිත ව ඇත. ලෝකයේ සෑම බසකින් ම පාහේ ගන්නා ලද වචන, දිනෙන් දින වැඩි වන ප්‍රමාණයකින් සෘණීකරණ වශයෙන් ඉංග්‍රීසි බසට එකතු වීම නිසා එහි වාග්කෝෂය අනවරතයෙන් වැඩි වී ඇත. ලෝකයේ විද්‍යාව පිළිබඳ දැණුම ක්‍රමයෙන් වැඩි වත්ම සංකීර්ණ පාරිභාෂික පද අවුරුදු පතා ඉංග්‍රීසි භාෂාවට එක් වීම ම සිදු වේ. එමගින් භාෂාව තව තවත් පුළුල් වේ.

A.2 TEST CASE 2: LEVEL 2 FONT TYPE

1. විද්‍යාව හා ඒ ආශ්‍රිත ක්ෂේත්‍රයන් පිළිඹද විඥානය ක්‍රමයෙන් පුළුල් වීම අනිවාර්‍යය සංසිද්ධියකි. මෙය ක්ෂණික ක්‍රියාවලියක් නොවූවත් අඛණ්ඩ ක්‍රියාවලියකි. චන්ද්‍රිකා තාක්ෂණයෙන් විශ්ව තරණයට පිවිසීම මෙහි එක් උදාහරණයක් ලෙස දැක්විය හැකිය.

2. පහත දක්වා ඇත්තේ මිශ්‍ර සිංහලයේ අකුරු දෙකක් පමණක් සංයෝග වීමෙන් සෑදෙන බැඳි අකුරු සහිත වචන වේ.

අන්ථ, සන්ධ, ග්‍රන්ථ, අණ්ඩ,විදග්ධ,
All the conjunct letters shall be tested for their availability and accuracy

A.3 TEST CASE 3: LEVEL 3 FONT TYPE

Type following key combinations and generate the desired output
ධ + ා + ම + ර් + ි + ක = ධාර්මික

Generate following Sinhala characters
Sinhala Letter 'ILUUYANNA' ඐ,
Sinhala vowel sign DIGA GAYANUKITTA ෳ

Generate given touching letters using the touch key
E.g.
ස + touch key + ස = ස‍්ස
ම + touch key + ම = ම‍්ම
Following touching letters should be displayed correctly. If any extra touching letters has been implemented, they shall also be tested for accuracy.
බ‍්ධ ත‍්ථ න‍්ථ ස‍්ව

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SRI LANKA STANDARD

SRI LANKA STANDARDS INSTITUTION

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