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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
ORGANISATION INTERNATIONALE DE NORMALISATION
ISO/IEC JTC 1/SC 2/WG 2

Universal Multiple-Octet Coded Character Set (UCS)

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1. Introduction

This document is a standing document of ISO/IEC JTC 1/SC 2/WG 2/IRG for standardization of CJK Unified Ideographs. It consists of a set of principles and procedures on a number of items relevant to the preparation, submission and development of repertoires of Chinese-Japanese-Korean (CJK) Unified Ideographs extensions for additions to the standard (ISO/IEC 10646). Submitters should check the standard documents (including all the amendments and corrigenda) before preparing new submissions.

For anything not explicitly covered in this document, the IRG will follow the Principles and Procedures of WG2 and other higher level directives.

1.1. Scope of IRG Work

The IRG works on CJK ideograph-related tasks under the supervision of WG2 (SC2 Resolution M13-05). The following is a list of current and completed IRG projects:

a. CJK Unified Ideograph Repertoire and its extensions
b. Kangxi Radicals and CJK Radical Supplements
c. Ideographic Description Characters
d. IICORE (International Ideographs Core)
e. CJK Strokes
f. Old Hanzi

Work on new projects requires the approval of WG2 and preparation of documents for such approval is required before the projects can be proceeded officially by the IRG.

1.2. Scope of This Document

The following sections are dedicated for standardization of CJK Unified Ideographs, describing the set of principles and procedures to be applied in the development of a new repertoire of CJK Unified Ideographs as specified in Section 1.1.a.

This document does not cover the standardization of other IRG activities listed in Section 1.1. Standardizing CJK Compatibility Characters maintained in UCS for the purpose of round-trip integrity with other standards is out of IRG scope. However, CJK compatibility characters submitted to WG2 must be reviewed by the IRG to avoid potential problems. For handling mis-unification and duplicate ideographs, Annex I and J of this document should be referenced.

2. Development of CJK Unified Ideographs

(TBD) When and under which conditions will a new extension of CJK Unified Ideographs be developed as an IRG project?

2.1. Principles on Identification of CJK Unified Ideographs

2.1.1. Encoding of abstract characters

A member of CJK Unified Ideographs is such an abstract character that should be determined by its own abstract shape. A CJK ideographic character can be written in many actual forms depending on the writing style adopted. Examples of common writing styles include Song style and Ming style as typical print form, Kai style as hand written form, and Cao style as cursive form. Stylistically different forms of the same character can be represented by different number or different type of strokes and/or components, which may affect identification of the same abstract shape. In order to reach a common ground to identify those abstract shapes to be encoded as distinct CJK Unified Ideographs, the IRG only accepts submissions using print form of glyphs (usually Song style or Ming style).

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2.1.2. Unification procedures of CJK ideographs

Standard print forms of CJK ideographs are constructed with a combination of known components and/or stroke types. Most of them are determined by two components - a radical chosen to classify the character in dictionaries and possibly reflect the meaning of the character and a phonetic component which represents the pronunciation of the character [to be revisited]. Basically, two submitted print forms of glyphs with different radicals are distinct characters even they have the same phonetic component. For non trivial cases, further shape analysis must be conducted. Two similar glyphs shall be decomposed into radicals, components and/or stroke types and evaluated by following the unification procedures described in Annex S of ISO/IEC 10646.

2.1.3. Non-cognate rule

No matter how similar two ideographs is in actual shape, non-cognate or semantically different glyphs shall be considered to have different abstract shapes. The following gives examples of characters with very similar glyphs, yet the characters are semantically different, thus considered having different abstract shapes because they are non-cognate.

'戓'(U+620C) and '戒'(U+620D) differ only in rotated strokes/dots (S.1.5 a).
'曰'(U+66F0) and '日'(U+65E5) differ only in contact of strokes (S.1.5 c). [TCA: to provide a relevant example for this case]
'于'(U+4E8E) and '干'(U+5E72) differ only in folding back at the stroke termination (S.1.5 f).

Because shape analysis alone may not tell non-cognateness or semantic differences, it is the submitter's responsibility to provide information and supporting evidence in order to invoke the non-cognate rule.

2.1.4. Enhancement of Annex S with new submission

Examples in Annex S shall be continuously updated. In reviewing character submissions, the IRG shall consider whether or not a new submission is worthy of inclusion in an Annex S update as a new example for unification or disunification.

2.2. Principles on Submission of Ideographs to the IRG

2.2.1. Basic Rules for Submission

A member body may submit the following to the IRG along with its repertoire. Different information may be handled differently as specified below.

a. **New Sources to existing Standard**. If the submission specifies new sources to some existing standards, it needs to be reviewed and approved by the IRG and submitted to WG2.
b. **New Sources to working sets**. In case there are some remaining D-set characters in previous standardization stages, new sources reviewed and approved by the IRG shall be incorporated into the current working sets by the IRG technical editor.
c. **New Compatibility Ideographs.** In case a member body needs to add compatibility ideographs, these characters must be reviewed by the IRG before submission to WG2 to avoid potential problems of unification and/or dis-unification with other CJK characters.
d. **New Unified Ideographs.** All ideograph submissions must be subject to the following rules:
   (1). **Collection Size**: A member body should not submit more than 4,000 ideographs at any one time. This is to minimize the burden of reviewers during the eye-ball checking process and to achieve a higher quality of standard within a shorter period of time.
   (2). **Pre-submission Unification Checking**: A member body should be EXTREMELY CAUTIOUS about ***not to submit unified ideographs that are already standardized or previously discussed*** and recorded at IRG meetings. By nature of the ideographs, it is very difficult for reviewers to find out all unifiable ideographs. Thus, it is important to keep high quality at the time of submission. Low quality submission may become a subject of "5% rule" described in Section 2.2.5 below.
   (3). **Document Registration**: All submission documents should be registered as IRG N documents, whose file name should be in the form of:

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where nnnn indicates an IRG rapporteur assigned document number, *mmmm* indicates member body's name, [sss needs to be defined] and ppp indicates the working set or repertoire name (such as Ext_C).

2.2.2. Required Font to be submitted

a. ***Glyph image*** : Each proposed ideograph must be accompanied by a corresponding 128 x 128 bitmap file in Song or Ming style. The file name should be the same as the source ID (defined below in Section 2.2.3.) with .png as its file extension.

b. ***TrueType font*** (optional): TrueType Font availability is highly recommended although not necessary. Font specification can be found under point 5 of A.1. – Submitter's Responsibilities in Annex A, WG2N3452)

2.2.3. Required Data to be submitted

The following data for each proposed ideograph must be submitted with CSV (Comma Separated Value) text format (in UTF-8) or Microsoft Excel format file:

a. ***Source ID*** to indicate the source and the name of the glyph image for track-keeping. ID should begin with a member body code (G,T,J,K,V,KP,H,M,or U). ID should be no more than 9 characters and should contain only Latin capital letters, Arabic numbers, and hyphens.

b. ***Glyph Image file name*** or Truetype codepoint of submitted glyphs.

c. ***KangXi Radical Code*** (R001-R214) with a flag (.0 or .1) to indicate whether the ideograph is simplified or traditional.

d. ***Stroke Count*** of the Non-radical Component.

e. ***Flag to show whether the ideograph is traditional (0) or simplified (1).***

f. ***First Stroke Code*** of the Non-radical Component (ref. IRG N 954 AR and IRG N 1105).

g. ***Ideographic Description Sequence*** (ref. Annex B ?).

h. ***Similar Ideographs and Variant Ideographs*** (optional) of the submitted ideograph.

2.2.4. Required Evidence to be submitted

a. **Supporting Evidence**: Evidence should be supplied to support the proposed glyph shape and the usage and context with pronunciations, meanings, etc., to convince the IRG that it is actually being used and/or non-cognate with other similar ideographs.

b. **Questionable Characters** (optional): For candidates with possible unification questions, submitters are encouraged to supply more detailed evidence of use from authoritative sources and additional information on other related characters, variants and characters similar in shape or meaning encoded in UCS for review.

2.2.5. Quality Assurance: The 5% rule

For any character encoding standard, a common general principle is to encode the same character once and only once. It is the submitter's responsibility to filter out already encoded characters before submission. In assessing the suitability of a proposed ideograph for encoding, the IRG shall evaluate the credibility and quality of the submitter's proposal. If the IRG should find more than 5% of duplicated characters in the latest UCS from the submitter's source set during the IRG review process, the whole submission will be removed from the subsequent IRG working drafts for that particular IRG project.

2.3. Principles on Production of IRG Working Drafts

After the IRG accepts all submissions, the IRG technical editor will produce a set of IRG working drafts.

2.3.1. Principles on Submitted Ideographs

a. All the original ideograph submissions, including glyphs, IDS, radicals, stroke counts and evidence, must have registered IRG document numbers.

b. If any required information is missing, the IRG technical editor can ask for additional information from the submitter. Without timely supply of such information, the submission can be rejected by the technical editor for production of a working draft.

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2.3.2. Principles on Assignment of Serial Number

a. The IRG technical editor should consolidate and sort the submitted ideographs in accordance with Annex A of this document.
b. A unique *serial number* should be assigned to each submitted ideograph after consolidation. The serial numbers must be unique throughout the entire standardization work process. They must not be changed, re-set, re-numbered, or re-assigned. This principle allows easier reference to past discussions.
c. If ideographs submitted by different member bodies are obviously unifiable, such ideographs may be unified and assigned the same serial number by the IRG technical editor.

2.3.3. Principles on Machine-Checking of IDS of Submitted Ideographs

a. The IRG technical editor should check the submitted IDS with existing IDS data to detect possible unifiable and/or duplicated ideographs.
b. Machine checking sometimes detect obviously non-unifiable pairs. Such cases should be filtered out before proceeding to the next stage.
c. IDS checking algorithm should satisfy the requirements described in Annex B.

2.3.4. Production of IRG Working Drafts

a. **Division of Character Subsets**: By the result of IDS checking, submitted ideographs shall be grouped into the following two working sets:
   i. **M-set (main set)**: for ideographs with proper IDS, and found not to be unifiable with current standardized ideographs nor previously discussed ideographs with proper IDS.
   ii. **D-set (discussion set)**: for ideographs with missing or incomplete IDS, or ideographs that might be unifiable with standardized or previously discussed ideographs. Ideographs with missing or incomplete IDS should be commented as such, and checked intensively through manual checking. Ideographs that might be unifiable with standardized or previously discussed ideographs should also be commented as such, and their unifiabilities must be manually checked and supported by evidence for disunification.
b. **Naming of Working Drafts**: The file name should follow the format of "IRGNnnnnVX[XXX]" where "nnnn" is the IRG assigned document number and "X" is the version number. No space is allowed but use of underscore "_" for separation is allowed. Examples of version numbers are "V1.0", V1.0Draft", etc.
c. **Glyph Images**: Archive of consolidated glyph images whose image size should be 128x128 with file name using the Source ID with the extension .png.
d. **Addition of Characters**: No ideographs should be added to the working set once development process begins.
e. **Previous D-Set:** If a previously discussed D-set exist, new D-set ideographs should be merged with the previous existing D-set.
f. After consolidation, the IRG chief editor and technical editor may ask members to review M-set and D-set based on IRG scheduled review schedule and task division.

2.4. Principles on Reviewing IRG Working Drafts

If the IRG instructs member bodies to review a working draft, member bodies' editors should review the working draft (different portions may be assigned to different member bodies) according to schedule following the principles set out below.

2.4.1. General Principles on Reviews

a. Each member body should check the ideographs of the working sets requested by the IRG chief editor and technical editor for the following issues:
   i. Correctness of KangXi radical and KangXi Index, Stroke Count, Radical, First Stroke and IDS.
   ii. Correctness of Glyphs and source information if necessary.
   iii. Any duplicate or unifiable ideographs based on Annex S guidelines.
b. When any data, including IDS, KangXi radical, or stroke count is found to be incorrect, such M-set ideograph should be moved to D-set as its standing data showing uniqueness is no longer valid. Until such ideograph is assured to be unique by manual checking (procedures described in Section 2.4.2.), it should not be moved back to M-set.

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2.4.2. Principles on Manual Checking (Eyeball Review)

a. **Duplication and Unification:** For D-set ideographs, members should ensure that they may not be duplicated or unified with any ideographs in the standard or in another working set (including the current one).

b. **Radical Checking:** Assurance is done by enumerating all possible radicals of a target ideograph and looking for any duplicate or unifiable ideographs in the range of ±2 stroke counts of standardized and working ideographs by eyeball checking. For example, "閘" may have the radical of "門" with 6 strokes, or the radical of "耳" with 8 strokes. In such a case, checking standardized and working set ideographs with radical of "門" and 4-8 strokes, or ideographs with radical of "耳" and strokes of 6-10 manually can have much better assurance that such an ideograph does not have duplicate or unifiable ideographs.

c. **Recording of Review Results**: After eyeball review, the reviewing member body should put down the comment of "Checked against all standardized and working ideographs with radical *X* and stroke of *Y*±2."

2.4.3. Submission of Possibly Unifiable Ideographs

a. **Comments Preparation**: Member bodies should prepare comments and feedback with reference to the assigned serial number of the ideograph in question. The guidelines on comments are described in Section 4 of this document. Comment files should be in CSV form as a text file or a Microsoft Excel format file

b. **Additional Evidence and Arguments**: For D-set ideographs that might be duplicated with other standardized or working ideographs, a *submitter member body* should prepare arguments with further evidence supporting the use, evidence document showing that the suspected ideographs are not unifiable e.g. dictionaries, legal documents, publications, etc. for all of those proposed ideographs which have been questioned for possible unification with existing UCS or other proposed ideographs in the same working draft or another draft.

c. **Submission deadline:** Each member body should send feedback comments at least two months before the next IRG meeting. The IRG chief editor and technical editor should consolidate them and register the result as IRG N documents a month before the next IRG meeting so that each member body can examine the comments and prepare any additional documents for discussion at the meeting.

d. **Rejection**: Questioned ideographs with no counter arguments shall be automatically marked as unified.

2.5. Principles on Discussions at IRG Meetings

2.5.1. Document-based Discussion

For efficient and smooth work, all discussion items and evidence must be prepared with registered IRG documents before the commencement of an IRG meeting. Items or evidence not appeared in the IRG document registry are not treated as evidence and will not be discussed during IRG meetings. Any discussions on evidence or items raised after the commencement of an IRG meeting may be postponed to the next IRG meeting if any member body requests longer time to examine such items or evidence.

2.5.2. Discussion Procedures

Discussion should be based on the review comments on working sets. For non-unification issues, a submitter should present evidence document(s) showing that suspected unifiable ideographs are distinctively used as non-cognate character in the same region, or that these two characters cannot be unified in accordance with Annex S. When IRG members have consensus that the ideographs are unifiable, the submitter should take one of the following actions, and the decision must be recorded.

a. Withdraw the duplicate ideographs and map the character in question to the existing standardized or working set ideograph.

b. Change the submission as compatibility character by the original proposer.

c. Add this character as a new source to the existing standardized or working set ideograph.

When characters are reviewed by different people, different choice of radical, stroke count or first stroke code are possible for the same ideograph. IRG members should resolve to the most

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appropriate one based on the most common abstract shape of the specific glyph. When KangXi radical or stroke count is agreed to be incorrect, the ideographs should be moved to D-set and wait for another manual review to prevent any unification error caused by not having covered the reviewed with Ideographs with the correct KangXi radical or stroke count.

Guidelines on typical comments and resolutions are given in Section 4 of this document.

2.5.3. Recording of Discussions

Comments, rationales, and decisions must be recorded for each ideograph reviewed in a tabular format for reference and checking.

2.5.4. Time and Quality Management

Before discussion begins, the number of ideographs under review should be counted and the estimated schedule should be determined based on it. During the discussion, the number of comments reviewed per hour should be noted and the schedule should be adjusted by this rate. If there are more than 600 comments to be reviewed, they may be partitioned and resolved in subsequent IRG meetings if one IRG meeting does not have enough time.

2.6. Principles on Submission of Ideographs to WG2

2.6.1. Stablized M-Set Checking

a. Once M-set is consolidated and stablized, the ideographs of M-set should be checked at least once as a complete set for intensive checking to assure data and glyph integrity.
b. Approval by all member bodies is needed before the collection shall be prepared for WG2 submission.

2.6.2. Preparation for WG2 Submission.

After the approval by majority of IRG member bodies, the IRG technical editor should prepare the following:

a. Sort the final stable M-set ideographs by the sorting algorithm described in Annex A.
b. Assign provisional UCS code to the sorted M-set ideographs (with agreement from ISO 10646 project editor on block assignment).
c. Make available the TrueType fonts for each member body with assigned provisional UCS code (fonts have to be available in accordance with the requirement stated in point 5 of A.1. – Submitter's Responsibilities in Annex A, WG2N3452)
   i. Each submitter is encouraged to prepare its own font for best font quality.
   ii. If a member body has difficulty creating the font, other member bodies or the IRG technical editor may help creating the font. In this case, the glyph style of the submitter must be respected.
d. List source references
e. Produce packed Multi-column format Ideograph Chart, made by the created TrueType fonts.

The IRG should conduct at least one round of review of the table generated with TrueType font before submission to WG2.

3. Procedures

This section describes the basic development procedures of CJK Unified Ideograph extensions. The ultimate purpose of this section is to realize the production of high quality CJK Unified Ideograph sets in an efficient manner.

Development procedures described in this section consists of 8 stages, and it may take two to three years to create a high quality ideograph set for standardization.

3.1. Call for Submission

a. When a member body requests a new project for CJK Unified Ideograph extension and when the project is agreed upon at an IRG meeting, the IRG may call for submission of new ideographs. The IRG must also determine the deadline for the submission.

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b. Each member body with proposed ideographs must submit the ideographs before the specified deadline with required data described in Section 2 of this document.
c. Member bodies must check whether the submitted ideographs are accompanied with all required information. If some required information is missing or misplaced, the IRG technical editor may ask the submitter to resubmit or supply the additional information if only minor problems are encountered. Otherwise, the submission can be rejected because consolidation to other member bodies' submissions cannot be carried out.

3.2. Consolidation and Grouping of Submitted Ideographs

Consolidation of submissions is normally done between IRG meetings. The consolidation includes the following tasks:

a. The IRG technical editor should sort and assign *serial numbers* to submitted ideographs as described in Section 2.3.2.
b. After serial numbers are assigned, submitted ideographs must undergo IDS checking to detect any duplication and unification. By the result of IDS checking as described in 2.3.3, submitted ideographs will be grouped into M-set and D-set as described in Section 2.3.4.
c. After consolidation, a working draft will be assigned an IRG N document number with a version number, and will be distributed to member bodies' editors and made available so that any other experts can have access to it. The IRG chief editor and technical editor may ask and assign member editors to check M-set and D-set ideographs either for the entire collection or certain portions of it depending on reasonable estimation of workload by the IRG chief editior and technical editor.

3.3. First Checking Stage

This stage will be held between IRG meetings. The checking involves the following tasks:

a. Each member body's editor must check the assigned M-set and D-set for data integrity, correctness, missing data, and duplication. Checking for unification is not mandatory, but desirable. Typical review comment examples for each set are provided in Section 4.
b. Members must submit their comments to the IRG chief editor and technical editor at least two months before the next IRG meeting.
c. The IRG technical editor must consolidate the comments and produce an IRG registered document for circulation and discussion at least one month before the next IRG meeting.
d. Submitters are encouraged to prepare and submit supplementary documents (with IRG document numbers) so that they can be discussed at the next IRG meeting.

3.4. First Discussion and Conclusion Stage

This stage will be held during an IRG meeting and the tasks include:

a. Members should review the comments which are officially submitted before the meeting with assigned IRG document numbers and the editorial group must make conclusions for each commented ideographs in writing. Guidelines for typical conclusion are provided in Section 4.
b. All the conclusions must be endorsed/agreed by the IRG plenary in its resolutions. As a result of resolution, some ideographs would be removed or moved between M-set and D-Set.
c. The IRG technical editor should create a new M-set and D-set a month after the IRG meeting, and register them as IRG registered document with version information.
d. If more than 5% of ideographs submitted by a specific submitter is removed as a result of duplication or unification with existing standardized set, the entire submission of this submitter should be removed to ensure high quality of the project.

3.5. Second Checking Stage

This stage will be held between IRG meetings with the following tasks:

a. Each member body's editor must check the newly created M-set and D-set for correctness and any duplication.
b. Members should submit their comments with registered IRG document number to the IRG chief editor and technical editor at least two months before the next IRG meeting.

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c. The IRG technical editor should consolidate the comments and produce a registered IRG document for discussion at least a month before the next IRG meeting.
d. Members are encouraged to prepare supplementary documents to facilitate discussion during the next IRG meeting.

3.6. Second Consolidation and Conclusion Stage

This stage will be held during an IRG meeting with the following tasks:

a. Members must review the comments and make conclusion for each ideograph. Typical comment and conclusion examples for each set are provided in Section 4.
b. All the conclusions must be endorsed/agreed by the IRG plenary in its resolutions. As a result of the resolutions, some ideographs may be removed or moved between M-set and D-set.
c. The IRG technical editor should create a new M-set and D-set a month after the IRG meeting, and produce an IRG registered document.
d. If more than 5% of ideographs submitted by a specific submitter is removed as a result of duplication or unification with existing standardized set, the entire submission of this submitter should be removed to ensure high quality of the project.

3.7. Final Checking Stage

This stage will be held between IRG meetings with the following tasks:

a. All member bodies' editors are requested to check M-set intensively using comments and conclusions made in all previous stages. In the final checking stage, no ideographs are allowed to be moved from D-set to M-set.
b. Member bodies' editors should submit their comments to the IRG chief editor and technical editor at least two months before the next IRG meeting.
c. The IRG technical editor should consolidate the comments and produce an IRG registered document for discussion at least a month before the next IRG meeting so that member bodies' editors can have time to review them before the next IRG meeting.

3.8. Approval and Submission to WG2

This stage will be held during an IRG meeting with the following tasks:

a. Members should review the comments on M-set and make conclusion for each ideograph.
b. If there is no positive decision on an M-set ideograph, it should be moved to D-set. No character should be moved from D-set to M-set at this stage. Ideographs may only be moved from M-set to D-set.
c. With the approval from the majority of IRG member bodies, M-set should be frozen as the new ideograph extension set to be submitted to WG2. The IRG technical editor should prepare the document in accordance with Section 2.6 of this document.
d. The remaining D-set should not be removed. They should be kept and used in the next standardization work to maintain the discussion record and avoid repetition of discussion.

4. Guidelines for Comments and Resolutions on Working Sets

The following tables list guidelines for typical comments and conclusions during the development process. All comments must be accompanied with date (in YY-MM-DD format) and member identifier (G, T, H, M, J, K, KP, U or V). All conclusions must also be accompanied with a date.

4.1. Guidelines for M-set

M-set is the ultimate target of the standardized ideograph set. As such, it must be carefully examined. If any suspicious characters are found, they should be moved to D-sets or removed from the working sets all together.

Possible Comment by a Reviewer	Possible Resolution
Wrong/Missing Glyph	● Glyph is corrected/supplied and moved to

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	D-set for eyeball reviewing.
Wrong KangXi radical / stroke count / first stroke	● Data will be corrected and this ideograph will be moved to D-set. ● Proposal to correct data to remain in M-set cannot take immediate effect in the current round of consolidation as it is an ambiguous case and its change may affect others in the set.
Wrong IDS	● IDS will be corrected and the character will be moved to D-set until they are machine-checked again. ● Moved to D-set (in case IDS cannot be corrected).
May be unifiable with U+xxxxx (standardized ideograph)	● Unified with U+xxxx and submitter will request new Source ID to U+xxxx. ● Unified with U+xxxx and submitter will request this character as Compatibility Character. ● Unified with U+xxxx and this entry will be removed. (May consider registering it to IVS.) ● Not unifiable.
May be unifiable with xxxxx (M-set ideograph)	● Unified with *xxxxx* and this source ID will be attached to *xxxxx*. ● Unified with *xxxxx* and the submitter may consider it to register as Compatibility Character or IVS. ● Not Unifiable.

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4.2. Guidelines for D-set

D-set ideographs are those that cannot be checked automatically by IDS checking algorihtm or that are suspected to be unifiable with other standardized or working ideographs. For ideographs that cannot be machine-checked by IDS matching, at least two non-submitter member bodies must carry out eyeball checking to ensure that the ideographs are not unifiable with any standardized or working ideographs. For ideographs that might be unifiable with other ideographs, the submitter is requested to prepare arguments and evidence to show that such ideographs should be separately encoded.

Possible Comment by IDS Checker	**Possible Conclusion**
Incomplete IDS IDS with extra character DC is not an ideograph	● IDS will be corrected and it will be moved to M-set when the next IDS-check is done. ● Proper IDS cannot be generated and eyeball checking is needed.
Possible Comment by a Reviewer	**Possible Conclusion**
Wrong KangXi radical / stroke count / first stroke	● Data will be corrected. ● Proposal to correct data is not accepted, as it is an ambiguous case and the IRG agreed that the previous choice of *XX* is more appropriate.
Wrong IDS	● IDS will be corrected and will be machine-checked again. ● Correct IDS cannot be generated and human eyeball checking is needed.
May be unifiable with *U+xxxxx* (standardized ideograph)	● Unified with *U+xxxxx* and new source is added to *U+xxxxx*. Entry is no longer used. ● Not unifiable, as shown by the evidence *IRG N xxxx*. Moved to M-set.
May be unifiable with *xxxxx* (M-set or D-set Ideograph)	● Unified with *xxxxx* and this entry is no longer used. ● Unified with *xxxxx*. (*xxxxx* is removed.)

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	• Not Unifiable, as shown by the evidence *IRG N xxxx*. Moved to M-set.
Checked against all standardized and working ideographs with radical *X* and stroke of *Y*±2.	• Moved to M-set, as two non-submitter member bodies (*XX* and *YY*) have concluded that this ideograph is not unifiable with any existing standardized or working ideographs. • Checking against ideographs with radical *X* may not be enough. This ideograph should also be checked against ideographs with radical *Z*.

5. IRG Website

The IRG maintains its own web site at http://www.cse.cuhk.edu.hk/~irg/, hosted by the Department of Computer Science and Engineering at the Chinese University of Hong Kong. IRG meeting notices, minutes, resolutions, document register, documents and standing documents are made available at this site. Hyperlinks to WG2 websites will be provided for member bodies' easy access. For faster retrieval of documents and searching, documents should not be compressed and the site search engine window should be made available. Documents larger than 4MB must be split into multiple files for easy uploading, downloading and searching.

6. IRG Document Registration

All documents to be formally discussed by the IRG must be registered with assigned IRG document numbers.

6.1. Registration Procedures

The following gives the registration procedures:

a. **Request for Document Number:** All documents submitted to the IRG must be given a registered document number. The assignment is done by the IRG rapporteur. A member body shall first contact the IRG rapporteur for a document number with a document title. Once the document number is assigned, the information will be posted on the IRG website. Some document numbers can be pre-assigned during IRG meetings for activities between IRG meetings.

b. **Submission of documents:** All registered documents must be submitted to the IRG rapporteur. The submitted documents must also contain an assigned IRG document number in text form so that searching can be supported.

c. **Posting of documents**: Properly submitted documents are then posted by the IRG rapporteur on the IRG website as official documents.

d. **Disqualified documents**: Documents with certain basic information missing such as submitter's name, title, purpose can be rejected by the IRG rapporteur for posting. All other documents which fail to comply with the above registration process and the preliminary review by the IRG rapporteur for basic information will not be treated as IRG documents. As such, issues to be addressed will not be discussed by the IRG formally.

6.2. Contact for IRG Document Registration

The current IRG rapporteur is Dr. Qin LU and her contact information is as follows:

Professor Qin Lu
Department of Computing
The Hong Kong Polytechnic University
Hung Hom, Hong Kong
Tel. (852) 2766 7247
Fax. (852) 2774 0842
Email: csluqin@comp.polyu.edu.hk

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Annex A: Sorting Algorithm of Ideographs

Ideographs must be sorted by the following order.

a. **KangXi Radical order**.
Note: When radicals are in simplified forms given below, ideographs with simplified radicals must be placed after the ideographs with corresponding traditional radicals.

Simplified Radicals		Traditional Radicals	
R119.1	纟	R119.0	糸
R146.1	见	R146.0	見
R148.1	讠	R148.0	言
R153.1	贝	R153.0	貝
R158.1	车	R158.0	車
R166.1	钅	R166.0	金
R167.1	长	R167.0	長
R168.1	门	R168.0	門
R177.1	韦	R177.0	韋
R180.1	页	R180.0	頁
R181.1	风	R181.0	風
R182.1	飞	R182.0	飛
R183.1	饣	R183.0	食
R186.1	马	R186.0	馬
R194.1	鱼	R194.0	魚
R195.1	鸟	R195.0	鳥
R196.1	卤	R196.0	鹵
R198.1	麦	R198.0	麥
R204.1	黾	R204.0	黽
R209.1	齐	R209.0	齊
R210.1	齿	R210.0	齒
R211.1	龙	R211.0	龍

b. **Number of Strokes**.
Note: Simplified characters must be placed after traditional characters within the same stroke-number group.

c. **First stroke**.

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Annex B: IDS Matching

B.1. Guidelines on Creation of IDS

Each member body should consult IRG N 1155 on IDS creation.
[Document reference may be incorrect. The title of IRG N1155 reads **Possible multiple-encoded Ideographs in the UCS**]

B.2. Requirements on IDS Matching.

The IDS matching algorithm used by the IRG should support the following features:

1. IDS matching should be able to handle different split points.
   (e.g. ⿰亻頃 and ⿰化頁 should be matched.)
2. IDS matching should be able to handle different split levels.
   (e.g. ⿰亻悉 and ⿰亻⿱釆心 should be matched.)
3. IDS matching should match different glyphs of the same abstract shape.
   (e.g. ⿰礻申 and ⿰示申 should be matched.)
4. IDS matching should match similar glyphs.
   (e.g. ⿰忄生 and ⿰小生 should be matched.)
5. IDS matching should match IDS with different orderings of overlapping IDC.
   (e.g. ⿻三丨 and ⿻丨三 should be matched.)
6. IDS matching should match unifiable IDC patterns.
   (e.g. ⿰麥离 and ⿱麥离 should be matched.)
7. IDS matching should be able to handle the combination of the above.
8. IDS matching should be able to detect any inappropriate IDS, such as IDS being too long, IDS with non-ideographic DC, or missing or extra DC or IDC.

B.3. Limitation of IDS Matching.

It should be noted that IDS matching cannot detect unification or duplication if a component cannot be encoded by an IDS, or if the glyph itself is very complex. IDS matching is done by strict programming logics. It is not versatile on detection of the unifiable ideographs unless rules are explicitly given to the algorithm. Thus, it is not meant to be the replacement of manual checking. Rather, it is an assistive tool for quality assurance to identify duplication and known cases of unification. Therefore, it is very important for submitters to make sure that their submitted ideographs are not going to be unified with any standardized or previously discussed ideographs.

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Annex C: Urgently Needed Ideographs

C.1. Introduction

When a member body urgently needs a few ideographs to be standardized for some good reasons (such as they are Regional or National Standard ideographs), the member body may, with the approval of the IRG, submit the ideographs independent of the current working set to the WG2.

C.2. Requirements

The submitter of urgently needed ideographs must prepare the following documents:

b. All the documents required as in normal ideograph submissions.
c. In addition to the above, a document to show any unifiable ideographs in the current working sets against the submitted ideographs.
d. For ideographs not mentioned above, the document must prove that their submitted ideographs are not unifiable with any ideographs in the currently working set. Proof may be provided by showing which document the submitter checked, ideographs of which radicals and strokes they checked against each of submitted ideographs. It is an important responsibility of the submitter to check with not only current standardized CJK ideographs, but also the working set for any unifiable characters against their submission. Failure to do so, its submission will not be approved by the IRG for endorsement of independent submission.

C.3. Dealing with Urgent Requests

The IRG may at its discretion accept the document from the submitter of urgently needed ideographs for discussion if the amount of work is considered to be reasonably small for IRG review without unreasonable disruption to its on-going projects. Accepted submissions must be checked by the IRG for correctness, duplication and unification. All accepted ideographs as independent submission must be checked with the current working set. When an ideograph is found to be identical or unifiable with the ones in the current working sets, such ideograph must be noted and removed from the current working set if approval by WG2 is given.

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WG2 PnP Annex I: Guideline for handling of CJK ideograph unification and/or disunification error

(Source: ISO/IEC JTC 1/SC 2/WG 2 N2576R – 2003-10-21)

There are two kinds of errors that may be encountered related to coded CJK unified ideographs.

Case 1: *to be unified* error - Ideographs that should have been unified are assigned separate code points.

Case 2: *to be disunified* error - Ideographs that should not have been unified are unified and assigned a single code point. An example of this is the request from TCA in document N2271.

When such errors are found, the following guidelines will be used by WG 2 to deal with them.

I.1 Guideline for "to be unified" errors

A. The "*to be unified"* pair will be left disunified. Once a character is assigned a code position in the standard, it will not be removed from the standard.
B. If necessary, an additional note may be added to an appropriate section in the standard.

I.2 Guideline for "to be disunified" errors

A. The ideographs to be disunified should be disunified and should be given separate code positions as soon as possible (disunification in some sense, and character name change in some sense also). These ideographs will have two separate glyphs and two separate code positions. One of these ideographs will stay at its current encoded position. The other one will have a new glyph and a new code position.
B. For the ideographs that are encoded in the BMP, the code charts in ISO/IEC 10646 are presented in multiple columns, with possibly differing glyph shapes in each column. The question of which glyph shall be used for the currently encoded ideograph will be resolved as follows. In the interest of synchronization between ISO/IEC 10646 and the Unicode standard, the ideograph with the glyph shape that is similar to the glyph that is published in the "Unicode Charts" will continue to be associated with its current code position. For the ideographs outside the BMP, the glyph shape in ISO/IEC 10646 and the Unicode Charts are identical and will be used with its current code position.
C. The disunified ideograph will have a glyph that is different from the one that retains the current code position.
D. The net result will be an addition of new ideograph character and a correction and an additional entry to the source reference table.

I.3 Discouragement of new disunification request

There is a possibility of "pure true disunification" request. This is almost like the new source code separation request. This kind of request shall not be accepted disregarding the reasoning behind. Key difference between "TO BE DISUNIFIED" and "SHALL NOT BE DISUNIFIED is as follows.

a. If character pair is non-cognate (meanings are different), that pair of characters is TO BE DISUNIFIED.
b. If a character pair is cognate (means the same but different shape), that pair of characters SHALL NOT BE DISUNIFIED.

Disunification request with reason of mis-application (over-application usually) of unification rule should NOT be accepted due to the principle in resolution M41.11.

WG2 PnP Annex J: Guideline for correction of CJK ideograph mapping table errors

(Source: ISO/IEC JTC 1/SC 2/WG 2 N2577 – 2003-09-02)

In principle, mapping table or reference to code point of existing national/regional standard (in the source reference tables) must not be changed. But once a fatal error is found it should be corrected as early as possible, under following guidelines:

J.1 Priority of error correction procedure

A. Consider adding new code position and source-reference mapping for the character in question rather than changing the mapping table.
B. If change of mapping table is unavoidable, correction should be done as soon as possible.

J.2 Announcement of addition or correction of mapping table

Once any addition or correction of mapping table is made, an announcement of the change should be made immediately. Usually this will be in the form of a resolution of a WG 2 meeting, followed by subsequent process resulting in an appropriate amendment to the standard.

J.3 Collection and maintenance of mapping tables that are not owned by WG 2

There are many mapping tables, which are included in national/regional standards or developed by third parties. These are out of WG 2's scope. Any organization (such as Unicode Consortium) that collects mapping information, maintains it consistently and makes this information widely available is invited and encouraged to do so.

References

Document numbers in the first column in the following table refer to IRG working documents (ISO/IEC JTC 1/SC 2/WG 2/IRG Nxxxx), except where noted otherwise. For documents with no link, you may try http://www.cse.cuhk.edu.hk/~irg/ ; some older documents may only be available in paper form (contact the IRG rapporteur Prof. Lu Qin).

Doc. No.	Title	Source	Date
WG2 N3201	Principles and Procedures for Allocation of New Characters and Scripts and Handling of Defect Reports on Character Names	WG2	2007-03-14
N681	Annex S	Bruce Peterson and IRG Rapporteur	1999-11-18
N881	CJK Extension C Submission Format	IRG	2001-12-04
N953	Minutes of the Adhoc meeting on submitted documents: N941, N942, N944, N945, N948, N949	CJK ad hoc group	2002-11-22
N954	Report on first stroke/stroke count by ad hoc group	CJK ad hoc group	2002-11-22
N954AR	N954 Appendix: First Stroke / Stroke Count Chart	CJK ad hoc group	2002-11-21
N955	IRG Radical Classification	Ideograph Radical Ad Hoc	2002-11-21
N956	Ideograph Unification	Ideograph Radical Ad Hoc	2002-11-21
N1105	Amendments to IRG N954AR	Macao	2005-01-03
N1183	IDS decomposition principles(Revised by the IRG)	KAWABATA, Taichi	2005-12-28
N1197	Sample evidence for CJK C1 candidates	Japan	2006-05-22
N1372	On Better use of IDS on IRG development process	KAWABATA, Taichi	2007-11-09

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Glossary:[to be updated later]

Source: A reputable published document such as a dictionary, a standardization document, or a well published and widely read or referenced book which the IRG would consider as authoritative such that the characters in this source are considered reliable and stable for consideration of inclusion.

Abstract shape:

D-set:

M-set:

Working set:

Compatibility characters:

Ideographic Description Sequence(IDS):