INTERNATIONAL ELECTROTECHNICAL COMMISSION

Technical Committee No. 3 Documentation and graphical symbols

Database based procedure for the maintenance of IEC 60617 and other graphical symbols standards

Contents

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1   Introduction

This document is a revision of document 3/526/INF as requested during the meeting of TC3 in Charlottenlund.

Although the standard IEC 60617 *Graphical symbols for diagrams*, is frequently referred to in the standard as a case, the document describes a procedure for the maintenance of any international standard consisting of "collections of items" managed in a database. This includes graphical symbols of different kinds, as well as data element types.

The background to the proposal is described in **Annex A**.

The terminology used in this document is dealt with in **Annex B**.

2   General description of the procedure(s)

2.1   Overview

IEC 60617 is one of the international standards that contains "a collection of standardised items". It has for a long time been seen as a drawback that the graphical symbols could not be processed and published "item by item" in order to keep the information up-to-date. The introduction of a database as decided at the meetings in New Delhi, and demonstrated at the meeting in Charlottenlund, provides a possibility to do just that. The database is the tool needed, but in order to get all the benefits the procedures must be properly adapted.

The procedure described in this document is based on the use of the database and electronic communication. The description is split in three parts: it starts with the *preliminaries*, followed by either the *normal database procedure* or the *extended database procedure*.

Preliminaries is for the entering of the information in the web accessible database, and for taking a decision on whether any work should be carried out or not and, in the first case, if the normal database procedure or the extended database procedure is to follow.

The extended database procedure respects all stages of the procedure described in the ISO/IEC directives, the *original procedure*. However, no draft documents on the graphical symbols are circulated, but the graphical symbols are made available in the database only. The procedure involves the National Committees and the usual different project stages are introduced by formal messages to the National Committees.

The normal database procedure is faster and relies on the use of a V*alidation Team (VT)*, acting on behalf of the National Committees. In addition to the validation team only the Secretary/assistant Secretary for the committee in charge of the standard is involved. This procedure is applicable for graphical symbols that can be seen as combinations of already existing graphical symbols or new graphical symbols well within the boundaries of existing rules.

Figure 1 provides an overview of the procedure(s).

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Proposed items are entered to the database by authorized "proposers", i.e. persons in the NCs or the secretary of the TC that have got relevant training.
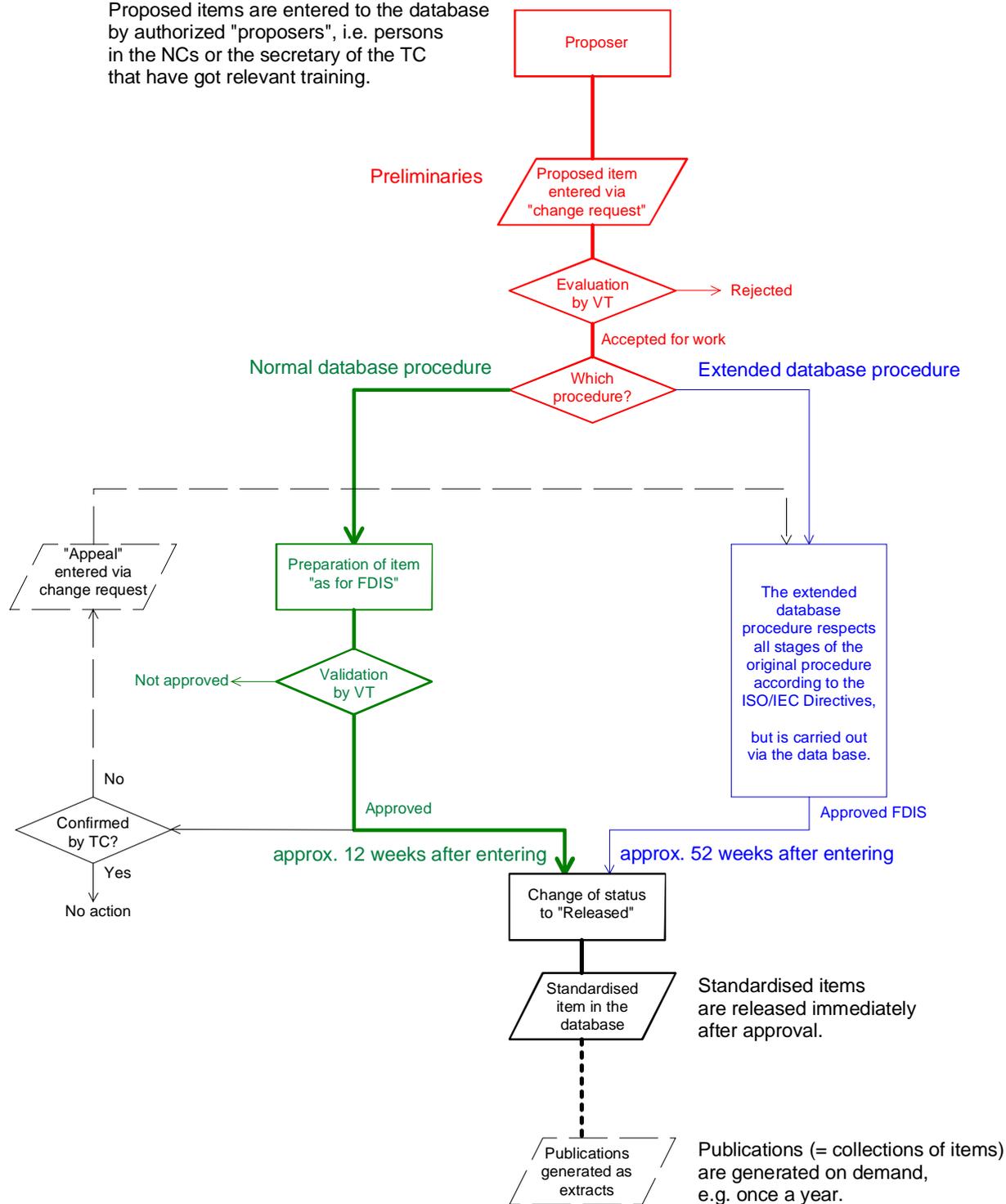
Proposer

Preliminaries

Proposed item entered via "change request"

Evaluation by VT → Rejected

Accepted for work

Normal database procedure

Which procedure?

Extended database procedure

"Appeal" entered via change request

Preparation of item "as for FDIS"

The extended database procedure respects all stages of the original procedure according to the ISO/IEC Directives,

but is carried out via the data base.

Not approved ← Validation by VT

No

Confirmed by TC?

Yes

No action

Approved

Approved FDIS

approx. 12 weeks after entering

approx. 52 weeks after entering

Change of status to "Released"

Standardised item in the database

Standardised items are released immediately after approval.

Publications generated as extracts

Publications (= collections of items) are generated on demand, e.g. once a year.

Figure 1 - Flow chart showing an overview of the procedures

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The content of the database is not limited to approved graphical symbols only, but includes also all graphical symbols in process.

> **The graphical symbols in the database with the status "released" (= "standardised") constitute the valid international standard.**

The concept "graphical symbol" is normally defined as: visually perceptible figure used to transmit information independently of language. (There are other definitions worded differently, but with the same meaning). This is a definition seen from the application point of view.

For a proper understanding of how the database works it should be noted that what we store in the database are not graphical symbols in this sense, but *objects that contains information on concepts including associated graphical representations.* A definition might be: *concept represented by a visually perceptible figure.* The concept has one unambiguous identifier, one name, if necessary a definition (at least when there are synonym names), at least one graphical representation (symbol variant), for each of which there might be several renditions (file formats). In this description the term "graphical symbol" is used with this meaning. When the *graphical representation* only is meant this is explicitly written.

2.2   Functionality in the database

For the purpose of the described procedures the following functionality is required from the application controlling the database:

−   The database shall be able to store graphical symbols and associated data , including information on the processing stages, such as: *proposed, accepted_for_work, rejected, released* and *withdrawn*. (See 5.13.2 of document 3(Charlottenlund/Task Force)7.

−   The database shall be able to store change requests and associated data, including information on the processing stages, such as: *submitted, accepted, rejected, resolved and withdrawn* (See 5.4.7 of document 3(Charlottenlund/Task Force)7.

−   The database shall be accessible via a web interface. How much/deep a person is allowed to enter depends on his role: Secretary, proposer, validation team member, ordinary user.

−   Appointed persons in the National Committees have a limited write access, allowing them to enter new graphical symbol proposals and change requests. These persons are in this description referred to as *proposers.*

−   The S*ecretary* for a specific standard has full write, read (and delete) access to the parts relating to this standard. He can also change status of the graphical symbols in process.

−   The *validation team* has read access to the entire information.

−   Other users have read access in accordance with future policy decisions.

3   Introduction of a new graphical symbol

3.1   Preliminaries

The procedure described in the following is applicable under "steady state conditions" (i.e. the initial loading and validation is out of scope of this description).

All proposals for change, *including the introduction of a new graphical symbol* or change to or the entire withdrawal of an existing symbol, are entered by a **change request**.

1. A *proposer* enters directly a proposal into the database or. Alternatively, a proposal can be submitted (by e-mail, fax, letter, etc) to the Secretary that is carrying out the physical entry.

   Two things need to be entered: the change request, that carries the "project information", and the graphical symbol that carries the "object information". One change request can be used to manage many graphical symbols.

   The entered graphical symbol with associated information will get the **status** *proposed* and (automatically) given an **identification**. The identification is a **once and for all** assigned registration number (unique within the context of the entire database) without any associated meaning. It will follow the graphical symbol, irrespective of whether it is rejected or released. Once the registration number is used it will be kept in the database and not reused again.

   NOTE - The existing symbol number in IEC 60617 depend on the logical position of the symbol in the printed publication and is not usable for this purpose.

   The change request with associated information will get the status *submitted* and also given an *identification*. This is a once and for all assigned registration number to the change request.

   The symbol is linked to the change request by the proposer (making use of the identification of the symbol(s)). The change accepted for evaluation is classified as either *editorial*, *techn_new* or *techn_mod*.

   The Secretary checks the change request with associated graphical symbol to see that it is formally satisfactory for entering, changes the status *of the change request* to *accepted*, and informs (by an e-mail exploder provided and maintained by the IEC/CO) the validation team on the proposal, asking for a first **evaluation** whether or not further work should be carried out, and which procedure that should be followed. Answer is requested within 4 weeks. For this decision it is sufficient if consensus is reached within a majority of the members. (There is no need for a formal voting for this decision.)

2. The validation team has to accept the graphical symbol for further work or to reject it. If rejected, the reason for the rejection needs to be communicated to the proposer and entered in the database as a **remark** to the graphical symbol. The status of the graphical symbol is changed by the Secretary either to *accepted_for_work* or to *rejected*. If rejected no further work is done and the status of the change request is also changed to *rejected*.

3. If the graphical symbol is accepted for work, the validation team shall also decide whether the normal database procedure, or the extended database procedure is applicable. The Secretary adds the information on the decision as a remark, and the procedure is continued either as described in clause 3.2 or as described in clause 3.3.

4. Criteria for selection of procedure are:

   – The normal database procedure should be used for changes (text and/or graphical presentation) to an existing graphical symbol, for new symbols that can be seen as combinations or of already standardised graphical symbols, and extension with a new symbol to an already standardised group of symbols.

   – The extended database procedure shall be used in all other cases and specifically in cases of appeal, see clause 3.5.

3.2   Extended database procedure

The extended database procedure is expected to be used only rarely, but is the one that most resembles the original procedure described in the directives and therefore described first.

In order to shorten the description, it is assumed that the proposed graphical symbol follows the procedure straight forward. It is, of course, possible that there might be comments against a graphical symbol so that the CD or CDV stage might need to be repeated (as described in the ISO/IEC Directives), but this does not change the principle way of working.

Figure 2 shows a "process map" with the different roles indicated along the vertical axis. This type of diagram highlights the flow, and indicates clearly when the different roles have to be active.
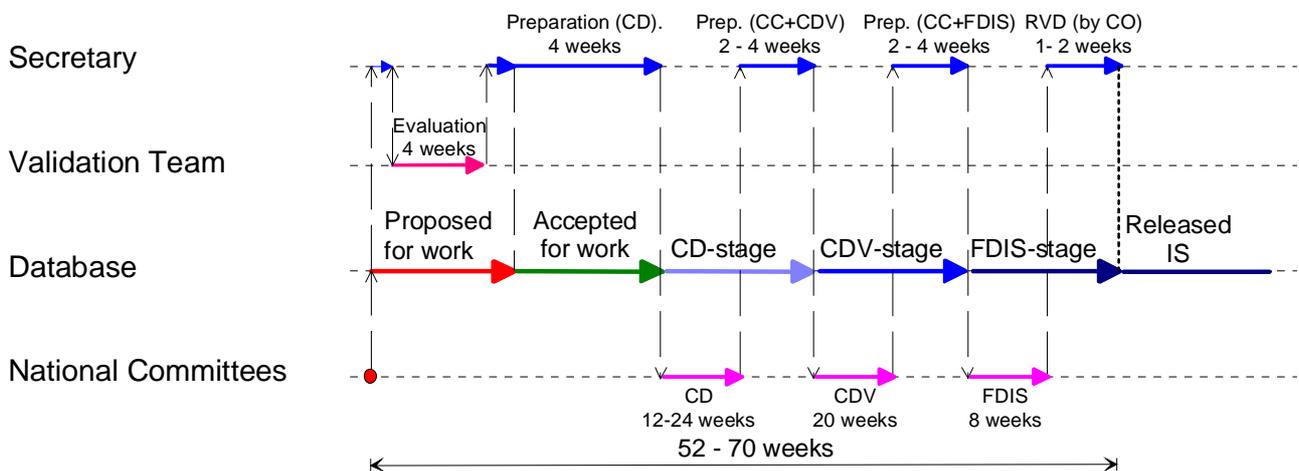
Figure 2 – The extended database procedure including preliminaries

1. If the extended database procedure is applicable the Secretary checks that the graphical representation of the symbol is in line with already existing related graphical symbols in (IEC 60617, ISO/DIS 14617, etc) and design rules (ISO 81714-1, IEC 81714-2 and –3), and that sufficient supplementary information is supplied. The Secretary makes necessary corrections. He or she may as necessary and possible use resources within the validation team. This work should be carried out within 4 weeks.

2. When the graphical symbol is sufficiently well prepared, the Secretary issues a formal e-mail to the National Committees, informing that the graphical symbol is available for commenting on the CD stage, within the normal time frame for CDs. Comments are to be sent to the Secretary. (Min 12 – max 24 weeks according to the directives)

    NOTE – When the procedure for electronic re-distribution to the experts in the National Committees is in place, it may be possible to shorten the times presently given in the directives.

3. After stipulated time the comments are compiled and made available as an ordinary compilation of comments (published on the web server). (Max. 4 weeks not along the critical line, say 2 weeks)

4. The graphical symbol and its associated information is prepared for the CDV stage taking note of the comments. When ready, the Secretary issues a formal e-mail to the National Committees, that the graphical symbol is available for commenting and voting for acceptance as an FDIS, within the normal time frame for a CDV. (20 weeks according to the directives)

5. After stipulated time the comments are compiled and the votes counted and made available as an ordinary compilation of comments and result of voting on a CDV. (Max. 4 weeks not along the critical path, say 2 weeks)

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6. The graphical symbol and its associated information is prepared for the FDIS stage taking note of possible editorial comments. When ready, the Secretary issues a formal e-mail to the National Committees, that the graphical symbol is available for voting for approval as an IS, within the normal time frame for a FDIS. (8 weeks according to the directives)

7. After stipulated time the votes are counted. If accepted the Secretary changes the **status** of the graphical symbol to *released,* the status of the change request to *completed,* and the procedure is finished. (say 1 week)

The extended database procedure for introduction of a new graphical symbol is possible to complete within approximately 52 - 70 weeks.

3.3   Normal database procedure

The normal database procedure does not involve the National Committees but a validation team. The validation team is composed of representatives for the National Committees.

Figure 3 shows a process map of this procedure.
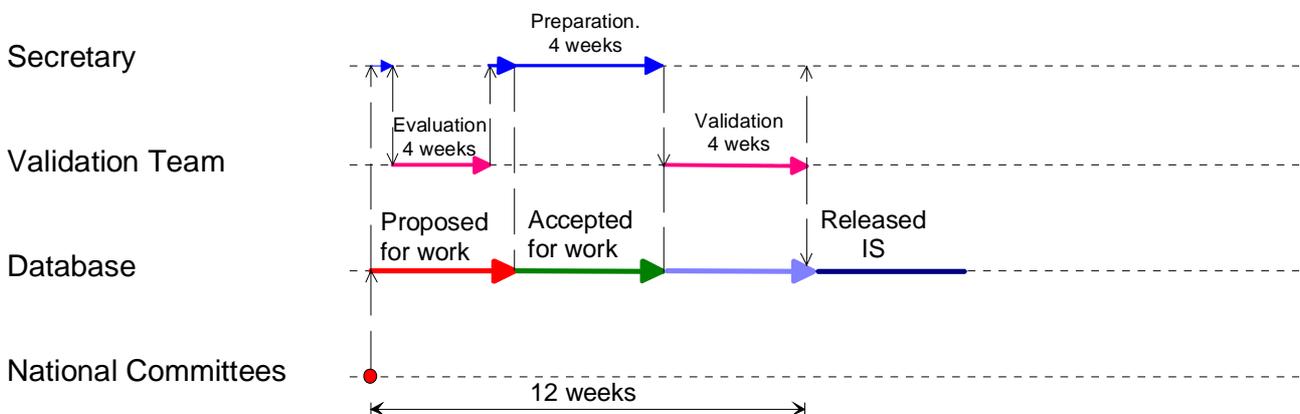
Figure 3 – The normal database procedure including preliminaries

1. If the normal database procedure is applicable the Secretary checks that the graphical symbol is prepared in line with already existing related graphical symbols in (IEC 60617, ISO/DIS 14617) and design rules (ISO 81714-1, IEC 81714-2 and –3), and that sufficient supplementary information is supplied in the database. The Secretary makes necessary corrections, and may as necessary and possible use resources within the validation team. This work should be carried out within 4 weeks.

2. When the quality of the information is satisfactory (i.e. the same as for an FDIS) , the validation team is informed (by e-mail) by the Secretary and called to vote within 4 weeks. All members of the validation team are obliged to vote, and the result is evaluated following the same rules as for voting on an FDIS. Negative votes shall be accompanied by a justification.

3. If not accepted, then the reason(s) are noted in the remark, the status of the graphical symbol is set to *rejected*, the status of the change request to *completed*, and the work is finished.

4. If accepted, then the Secretary changes the status to *released*, the status of the change request to *completed*, and the work is finished.

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The normal database procedure for the introduction of a new graphical symbol is possible to complete within approximately 12 weeks.

3.4 Confirmation by Technical Committee

The Secretary summarises the set of symbols approved in accordance with the normal database procedure in a report to the TC plenary meeting for confirmation.

3.5 Appeal

If the TC does not confirm all symbols included in the report, then a change request shall be issued for the symbol(s) in question, and processed in accordance with the extended database procedure.

4 Introduction of changes to an existing graphical symbol

4.1 Preliminaries

A change to an already existing graphical symbol (including associated textual information) in the database has to be both upstream (new for old) and downstream (old for new) compatible. This means that textual descriptions etc. must be technically equivalent after a change and that changes to the graphical representation have to be so small that a human reader considers the old and new one as "the same".

If this is not the case, then a new graphical symbol has to be entered and registered in connection with the registration of the change request.

The preliminaries are similar to those for the entry of a new symbol, with the exception that the change request is associated to an already existing symbol, and possibly also to a proposed new one.

4.2 Procedure if a new graphical symbol is entered

1. If the change request is accepted for work, and if a new graphical symbol is entered, the validation team shall decide whether the normal database procedure or the extended database procedure is applicable. The Secretary adds the information on the decision as a remark to the change request, and the procedure is continued either as described in clause 3.2 or as described in clause 3.3.

2. When the chosen one of these procedures is completed then the status of the new graphical symbol is changed to *released* and the status of the old one to *withdrawn*. The status of the change request is then changed to *resolved* and the work is finished.

4.3 Procedure if a new graphical symbol is not entered

1. If the change request is accepted for work and if no new graphical symbol is entered, i.e. it is a minor editorial change, either to the text or to the graphical representation, the Secretary describes the proposed change fully **in the change request** within 4 weeks.

2. When the quality of the information in the change request is satisfactory (i.e. the same as for an FDIS), the validation team is informed (by e-mail) by the Secretary and called to vote within 4 weeks. All members of the validation team are obliged to vote, and the result is evaluated following the same rules as for voting on an FDIS. Negative votes shall be accompanied by a justification.

5. If not accepted, then the reason(s) are noted in the remark, the status of the change request to *resolved*, and the work is finished.

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3. If accepted, then the Secretary makes the proposed changes to the existing, released, graphical symbol, either as changes to the textual information or through the provision of a new file for the graphical representation of the symbol. (A revision note is entered.)

6. The Secretary then changes the status of the change request to *resolved*, and the work is finished.

5 Publication

5.1 Network access

As stated earlier in this document the set of released (= standardised) graphical symbols in the database constitutes the valid standard. Direct read access to the released graphical symbols in the database by users is therefore seen as the most natural form of publication for the future.

The conditions for this depend on future policy decisions with regard to network access to IEC standards, and is therefore not further dealt with in this document.

5.2 Published extracts

Publications, to be distributed either in printed paper form or as electronic files, can be created as extracts of all *released* (= standardised) graphical symbols in the database at any time, even using "print-on-demand" technique. For this purpose a template for the presentation is required in an adapted application software.

The location of the graphical symbols in a publication is controlled by a set of entities in the database *paper_publication, publication_part* and graphical *symbol_in_paper_publication*. To the latter is the attribute *publication_reference* associated. This is the place where the traditional graphical symbol number used in IEC 60617 shall be located.

This technique makes it possible to change the composition of the publication and also to publish graphical symbols in other international standards, for example product standards, which is sometimes requested. The database can contain information on where such places are.

Reference to the valid graphical symbol shall in all cases be done to the neutral identifier given in *identification*. If a graphical symbol has been changed it is then always possible to find information on what has happened, if it has been replaced or withdrawn, for example, via the *symbol_history_relationship*.

6 Regular maintenance of the entire standard

In addition to the continuous maintenance described above, a comprehensive review of the entire collection of standardised items, e.g. IEC 60617, at regular intervals may be necessary. For such reviews the maintenance cycle concept as defined in 53/AC is relevant. For the carrying out of this work it may also be advantageous to set up a specific maintenance team.

The resulting proposal from such a work is formally to be entered into the database as one or more change requests, and then each change is dealt with according to the normal or extended database procedure as appropriate.

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Annex A
Background

This document takes into account the following:

−   **Resolution 22/97** of Group A of CA: Group A recommended to the CA that an electronic database containing the graphical symbols issued in the IEC 60617 series, be installed in CO and maintained by a maintenance agency being a National Committee on the basis of an agreement with IEC/CO including financial aspects.

    NOTE: This decision was taken before the introduction of *maintenance teams*, so it is unclear whether *a maintenance agency* according to the definition in the directives is really intended, or if simpler solutions could be sought. The task of the *Secretary*, as defined in this document, is intended to fulfil the same task.

−   TC3 decided at its meeting in New Delhi 1997 to set up a Task Force for the development of an information model to be used as a basis for the creation of a database at the IEC Central Office, for the management of the symbols of IEC 60617 and also of other symbol and item collections. The information model has now been developed and is available as **document 3(Charlottenlund/Task Force)7** on http://www.iec.ch/tc3/txt/3cph7.pdf .

−   **Administrative circular (1998) 53/AC** gave information on the decisions referring to the new procedure for the maintenance of IEC publications. The decision were effective as of 1998-06-01. One of the elements of this procedure is that committees may set up one or more *Maintenance Teams (MT)* or use existing Working Groups (WG or JWG) whose task is to keep a standard publication or a set of standards up to date. The procedure described in the document in hand goes still further, and the term maintenance team is therefore avoided in the connection with the standardisation of singular items in a database.

−   **Administrative circular (1998) 53/AC** also introduced the concepts "*maintenance plan*" and "*maintenance cycle*" for standard publications. The procedure described in the document in hand is intended for a "a collection of standardised items". Such a collection can be considered to be updated continuously and those concepts are therefore not directly applicable. However, in addition to the continuous updating it may be useful with a more thorough regular revision of the entire standard. This is dealt with in clause 6.

−   IEC 60617 was under the responsibility of SC3A. **SC3A was disbanded** and the work on graphical symbols for diagrams now managed directly by the Secretariat and the Assistant Secretariat of TC3.

Annex B
Terminology

Term with definition	Comments related to IEC 60617
3.1 **original procedure** for standard publications standardisation procedure as described in the **present** ISO/IEC directives relying on the **circulation of documents**	Applicable for standard publications, but in the case of database based standards only at revisions in the context of regular maintenance cycles of the entire collection of symbols in IEC 60617.
3.2 **normal database procedure** standardisation procedure making use of a *validation team* and a workflow around a database for information sharing (as specified in this document). NOTE 1 – The normal database procedure is used for validation of new graphical symbols and for graphical symbol combinations that are within the boundary of existing rules. NOTE 2 – Interimistically other means of electronic communication, like e-mail, may be used to implement the workflow.	Applicable in most cases when a new single item, e.g. a symbol is introduced or an existing one modified. The term "fast procedure" has not been used in order to avoid confusion with "fast track procedure", which is already defined (with an other meaning) in the directives.
3.3 **extended database procedure** standardisation procedure with stages and time frames as specified in the *original procedure*, but implemented **as a workflow around a database** for information sharing (as specified in this document).	Applicable in certain cases when new areas are being standardised and in cases of appeal.
3.4 **maintenance team** group of experts that has the task to carry out revisions of existing international standards at specified maintenance cycles following the *original procedure*	A maintenance team according to this definition is used, within the area of graphical symbols for diagrams, for the maintenance of the basic standards describing principles and methodology, and for regular revisions of the entire collection, say every 10 years, and when rules for the entire collection are established or modified, e.g. with regard to the printed layout. For the continuous maintenance of the graphical symbols in the database the procedure is different, and therefore the term maintenance team is not used in that context.
3.5 **validation team** a permanent, "executive", group of experts appointed by and acting between meetings of the committee (by electronic means, and within a short time frame) on behalf of their National Committees NOTE 1 - All P-members have the right to appoint an own member of the team. The validation team evaluates proposals and votes, in the normal database procedure, on symbols on behalf of their National Committees. The validation team reports to the technical committee or subcommittee. NOTE 2 – The described procedure asks for very short response times from the validation team members. Therefore, the National Committees shall appoint a deputy, that takes over the task when the ordinary one for any	The validation team, that is a permanent group, has two tasks: **Evaluation task:** members of the National Committees that are part of the validation team reach consensus on the acceptance of a proposal for work **Validation task:** voting on behalf of their National Committees for release of an item/symbol.

Term with definition	Comments related to IEC 60617
reason is absent (travel, business, etc.) NOTE 3 – It is up to the National Committee to decide for how long time a member should be appointed NOTE 4 – The secretariat manages the validation team.	
3.6 **proposer** person (or body) (at a National Committee, representing **all** TC's and/or appointed secretaries of ISO/IEC product committees) **authorised** to enter new proposals and change requests in the database NOTE 1 – There are many proposers. NOTE 2 – The required limited write access to the database is password protected, and authorisation will only be granted to persons appointed by the National Committees. Proposers have to be personally authorised, and should in connection with this authorisation get the required information and training.	