TECHNICAL REPORT

ISO/TR 16044

First edition
2004-06-01

Graphic technology — Database architecture model and control parameter coding for process control and workflow (Database AMPAC)

Technologie graphique — Codage du modèle d'architecture de base de données et des paramètres de commande pour le contrôle du procédé et le déroulement des opérations (Database AMPAC)

Reference number
ISO/TR 16044:2004(E)

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Published in Switzerland

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Foreword

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In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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ISO/TR 16044 was prepared by Technical Committee ISO/TC 130, *Graphic technology*.

Introduction

The purpose of this Technical Report is to prepare a database architecture model and control parameter coding that can be widely applied to design, process control and workflow management in manufacturing processes focused on the graphic arts printing industry.

The proposed architecture model and parameter list with appropriate units and values will enable the exchange of information on a global scale that can be accessed freely using world wide distributed database approaches and can also be used effectively as part of process control techniques. Such enhancement of information exchange offers the potential for significant cost reductions and/or efficiency improvements.

In the proposed architecture, all of the parameters impacting a manufacturing system are classified by using a layer structure. The upper two layers categorize the systems and system elements and set the structure for the process. The following layers characterize the details of the parameters used in the system.

For using the defined parameters effectively in the graphic arts industry, an example of a data coding method is shown in Annex A. These may include

— standard formats that describe a variable and both the technical and functional relevancy to it of other parameters in the database;

— requirements for describing a subset where a group of parameters are combined to give technical information;

— any requirements relating to access and disclosure of a specific information item.

Such an architecture allows a well-defined complete set of unified parameters and thereby minimizes the difficulties that frequently occur because of the mismatch and misunderstanding about the parameters among different fields, different vendors and different countries. Using such an approach, each industrial field involving multiple participants can create an appropriate database that has a unified and exchangeable coded term, and communicates through a unified information transport system like the Internet.

In use in the graphic arts example, this architecture would tie the client, designer, material supplier, preprinting, print shop, prepress operators, printing and post-printing machine operators, machine manufactures and machine maintenance supporters together into a common communication database, making it much easier to connect one production facility and system to another, and to exchange and share knowledge about process operation and material usage between participants. Based on a unified code and composition, the necessary databases can be generated independently in distributed computer files, even in different companies and yet function together in an open printing production system.

It is envisioned that there would be two lines of communication in AMPAC. One consists of control parameters used as an intelligent database open to all clients, printing manufactures and vendors in the world. The other would restrict information to specific users as is commonly done on Internet websites.

Individual users could generate AMPAC-based databases at their sites for diverse applications including

— transmitting any material, machine and machine-element specifications to vendors, customers or other manufacturers;

— automatic process specification and workflow selection based on customer requirements for adapting to equipment and materials;

— search for common relationships among parameters such as the effect of temperature on the process;

— constructing simulated systems for process design and testing;

— troubleshooting using related parameters;

— maintaining compatibility of machines and systems.

Since the architecture and database model proposed in this Technical Report have the potential to create high level intellectual databases, they can be easily joined with the Commerce at Light Speed (CALS) and Intelligent Manufacturing System (IMS) concepts.

The development of a Technical Report of this type can also contribute to the establishment of other standards such as standardized workflow-management systems and/or digital network-production systems.

Four data files are associated with this Technical Report: AMPAC_Parameter_list.csv, which provides a lookup table for obtaining the code corresponding to the alphabet name of a parameter; DatabaseAMPAC_PT.txt, which joins all named parameters to parameter codes; DatabaseAMPAC_VE.txt, which provides a list of available values for non-physical parameters; and DatabaseAMPAC_DE.txt, which provides the corresponding SI-base unit with a named unit.

Graphic technology — Database architecture model and control parameter coding for process control and workflow (Database AMPAC)

1 Scope

This Technical Report specifies a basic standard architecture model and parameters used in a database for printing-process control and workflow description. It defines how all of the parameters impacting a manufacturing system are classified by using a layer structure. The upper two layers categorize the systems and system elements and set the structure for the process. The following third and fourth layers characterize all details of the parameters used in the printing system, including standard coding rules.

2 References

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

ISO 1000:1992, *SI units and recommendations for the use of their multiples and of certain other units*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
ASCII
graphic character codes as defined in ISO/IEC 646

3.2
parameter
variable that specifies the state of an object

NOTE Two types of parameter are used in this Technical Report. One is the physical parameter, and the other is the non-physical parameter. The physical parameter is a variable that has a numeric value following its physical dimension given in SI units. The non-physical parameter is also a variable, but this one specifies the state of the object by using a non-numeric value that is assigned from a term or symbol list.

3.3
related parameter
another parameter that directly or indirectly affects the use of a required parameter

3.4
subset
set of parameters, selected from the Database AMPAC parameter list, to explain an object

EXAMPLE Objects may be machines, machine elements, materials or even concepts.

3.5
workflow
organizational scheme that gives the time schedules and relationships of all factors (operations, materials, process control elements and locations) in the process

4 Database architecture and coding rules

4.1 Layered structure for the architecture model

The architecture model shall contain all relevant process parameters such as the parameters relating to design specification, manufacturing process control measurements, material characteristics and specifications for machine and machine elements. These parameters shall be organized in a layered structure with four levels for classification (see Figure 1).

Each classification level shall be internally consistent with the broadest categories of the process workflow in the first level and increasing detail and specifics concerning the manufacturing process, materials and related parameters in levels two to four. The parameter shall appear in the 4th layer, and shall have a clear physical meaning and/or SI unit as defined in ISO 1000.

The values for a given parameter, listed in level four, or a function name (pointer) for getting the value of the parameter may be described by using the methods as shown in Annex A. The relationship of other parameters to that parameter can also be described. They give perspective to the function and are used to obtain the calculated resultant value of the parameter in the 4th the layer.

Any type of algorithm can be selected in this way, such as a numeric value, table, analytic function or membership function, since the description is only a pointer which points to the file location of the algorithm.

The combination of appropriate parameters defines a process that is a subset of the whole system (see Annex B). A factory or machine element may be a subset. In some cases, the parameter set used for describing a product may also be a subset, extracted from the parameter set contained in this architecture model.

Subsets may be constructed in all cases by using the basic architecture and parameters described here in order that subsets can be easily combined. To start and operate a production process, the value of all parameters in this subset shall be previously set or defined. A part of the production process may also be used as a subset, as long as the architecture and all relevant parameters are included.

Each conceptual element and parameter in each layer shall have a corresponding decimal numeric code. The code of each successive layer shall be combined in successive series in order to identify the parameter. The details of the combination and how it is used are shown in 4.2 and Annex A.

1st layer	Dictionary	Design	Production process	Material/Machine
2nd layer	0	Specification for products	Kind of specification for each process	Name of material/machine
3rd layer	0	Element of specification	Element of specification	Functional classification
4th layer	0: reference word (code)	Parameter	Parameter	Parameter
		List of units and values, if necessary		

Figure 1 — Architecture model for classification of parameters

4.2 Definition of parameter code and coded parameter list

In the database constructed on each site, each parameter shall be indicated by using a code number or a corresponding alphabet name as defined in this Technical Report.

When parameters use a written name, they shall be transferred to code for the convenience of data exchange in linguistic independency before being sent to another site. The graphic-arts table for obtaining the code corresponding to the alphabet name is given in File AMPAC_Parameter_list.csv. For reader convenience, Table 1 provides a listing of the names used in layers 1 and 2.

Code numbers shall consist of a combination of four blocks of decimal numeric characters, each of which shall uniquely designate the item in sequential layers. Four sets of decimal code numbers shall be joined serially in the order of the layer, followed by a “period” (character at position 2/E of ISO/IEC 646) as a separator, as follows:

“1st layer code. 2nd layer code. 3rd layer code. 4th layer code”

EXAMPLE “10.2.6.16” means: specification for design (1st layer). Information for placing and receiving order (2nd layer). Information about products (3rd layer). Number of products (4th layer).
(See Annex A and File AMPAC_Parameter_list.csv.)

NOTE In Annex A, the parameter having the code [0.0.0.0] is assigned as the dictionary and is used for defining in terms other than the numeric values or contents of the special parameters defined. The parameter name (code) of this category shall be given as “reference” in the data format and the specification of values associated with this parameter is given as a group of non-numeric terms (see Annex B). Individual Database AMPAC databases can prepare their dictionary as a specified dictionary and it shall have highest priority, although the standard common dictionary will be prepared in the common Database AMPAC for convenience. The defined values of parameters may be chosen from the common dictionary in the subset for each user.

The unit accompanying the parameter is also defined in the dictionary in a similar way to the assignment of values just mentioned above (see Annexes A and C). Each subset can define its own unit, although it should contain an explanatory note about the unit, except in the case where the meaning is given in ISO 1000.

Table 1 — First two layers of AMPAC architecture as applied to the printing industry

	1st layer	2nd layer
DIC	0 (Dictionary)	0
DESIGN	Specification for design	Information for placing and Receiving order Specification for rough design Instruction for layout Page contents of product Instruction for plate making Instruction for proof Instruction for printing Instruction for bookbinding Instruction for slitter Instruction for bag making Instruction for sack ...
PRODUCTION PROCESS	Prepress process	Character input Character composing Image input Image processing / edit Line-art image input Assembling / Markup Imposition Colour and text proof Proof Film output Press plate output Common ...
	Printing process	Process management Sheet-fed offset press Web offset Sheet letter press Web letter press Gravure sheet printing Gravure web printing Flexographic printing Screen printing Thermal transfer Electrostatic printing Magnetographic printing Electronic printing ...
	Postprinting	Cutting Web folding Sheet folding Web stacker bundler Gluing Gathering Saddle stitcher Adhesive binder Tipping (tip-in) Collator Laminate Extrusion laminate Unwind / wind Flexible packaging slitter Bag making Carton diecutting and creasing Box forming Sack Embossing Coating ...
	Printed material (substrate)	Paper Cloth Metal sheet Plastic sheet ...

	1st layer	2nd layer
MATERIAL / MACHINE	Printing materials	Film Printing plate Photo-polymer relief plate Blanket Ink Fountain solution Gravure cylinder ...
	Prepress systems	Phototypesetting Word processor Composing system Drum scanner Flat-bed scanner Digital camera Image processing system Line art processing system Page layout system DTP system Imposition system RIP Proof printing Film composing printer Platesetter Imagesetter Developer Composer CTP CTC (Computer To Cylinder) Inspection Data server Cylinder polisher Cylinder plating ...
	Printing machine systems	Sheet-fed offset press Web offset press Sheet-fed letter press Web gravure Sheet fed gravure Web gravure Web flexographic press Screen printing Thermal transfer Electrostatic printing Magnetographic Electronic printing ...
	Finishing/Converting	Cutting machine Folding machine for sheet Folding machine for web Gluing machine Web stacker bundler Gathering machine Saddle stitcher Adhesive side stitcher Tipping (tip-in) machine Collator Laminator Extrusion laminator Unwind / winder Slitter Enveloping machine Carton die cutter Box forming machine Sacker Embossing machine Coater ...

The following are three additional files associated with this Technical Report:

- **DatabaseAMPAC_PT.txt** The dictionary joins all of named parameters to a parameter code. Each parameter shall be coded by using the rule specified in A.3.1.
- **DatabaseAMPAC_VE.txt** Available-values list for non-physical parameter (see Annex B). This record is written by the format described in Annex A. The parameter name code of this record is 0.0.0.0:parameter name (code) and Q(name) is replaced by CDIC(name).
- **DatabaseAMPAC_DE.txt** Corresponding to SI basic unit with named unit (see Annex C). When the parameter name is 0.0.0.2:parameter name (code), the list of available units for the parameter name (code) is given in Data of the format described in Annex A (see Annex D).

NOTE The data in files named DatabaseAMPAC_VE and DatabaseAMPAC_DE may be imported by using conventional database software, although some of these are coded by using the Database-AMPAC format (see Annex A). When it is desired to export them to conventional database software, the character “semicolon” (character at position 2/C of ISO/IEC 646) should be specified as the data separator.

5 Limitation on usage of the parameter list

The parameter list, and associated code structure, contained in this Technical Report may be used freely, but should be ascribed to this specific version (Version 1) of AMPAC because every subsequent version of AMPEC will include added parameters.

Annex A
(informative)

Example usage of parameters code in a description format

A.1 Example of a rule for database coding by using coded control parameters

In practice, the coded control parameters would include all aspects used for process and product specification and evaluation, process control, environment and materials requirements and ordering and distribution information. All coded control parameters can have the same coded structure according to their classification based on the standard architecture model.

The format described here can also define any relevancy between a given parameter and the algorithm used to calculate a value for the parameter.

The parameter in the Database AMPAC may include a set of values as data or a functional method for deriving the parameter value followed by a related parameter list. The data order for describing data contents in the database is as follows:

manufacturer;[model identifier];[information group];parameter name[:reference:];

[identifier in parameter];n1; [PR1,PR2, … ,PRn1]; [Q(name)];

DIM;[DIMN];[DIML, DIMM, DIMT, DIMA,DIMK,DIMMOL,DIMCD] [DIM10];

[n2];[DATA1, DATA2, … , DATAn2]

A parameter record shall have only one “carriage return” (character at position 0/D of ISO/IEC 646) at the end of the record, although three carriage returns appear in the above explanation for convenience of documentation.

In the above format, the meaning and the contents of each part are as follows:

“[*…*]” the contents can be omitted if the condition would clearly be given;

“**semicolon**” (character at position 3/B of ISO/IEC 646)
separator of data element; this separator is necessary even if the content is omitted;

“**colon**” (character at position 3/A of ISO/IEC 646)
separator between the parameter name (or code) and reference;

“**comma**” (character at position 2/C of ISO/IEC 646)
separator between numeric data of the DATA array and ***DIML ~ DIMCD***;

manufacturer name of the manufacturer for the machine, machine element or material, name of designer;

model identifier where appropriate indicate product name to discriminate two or more products from a manufacturer in the AMPAC database;

information group the name of a receptacle which contains a set of parameters such as table or class;

parameter name parameter code with decimals explained in 4.2.1 or the parameter name;

reference must be used to refer or connect another information group, parameter, and/or identifier within the parameter. This is followed by the parameter name and written with a “semicolon” separator (3/A of ISO/IEC 646) in the following form:

:information group :parameter name :identifier in parameter:

The order of the elements shall not be rearranged. The whole group or the last one or last two of the code “0.0.0.0”, ***reference*** shall be referred to as the parameter name (or code) of the dictionary heading word (see Annex B).

identifier in parameter unique ID which discriminates a parameter from others having the same parameter name in the same information group;

n1 the number (including 0) of the related parameters ***PR1,PR2, … ,PRn1***;

PR1,PR2, … ,PRn1 the parameter code numbers or *(temporarily)* parameter names used to help calculate the value for the given parameter designated as ***parameter name***. These shall be separated by “comma” (2/C of ISO/IEC 646:1991) and are called related parameters.

Q(name) algorithm (function) for driving the value of the parameter designated as ***parameter name.*** The type of algorithm is represented by a pointer assigned to ‘***Q***’ as shown in the cases (a) to (g). If present, “***name***” is the name of the file which describes a usage, for example a function, a dictionary, a dimension list, etc.

a) case of single numeric data ;**VI( )**(integer) or **VR( )**(real):

In this case, replace ***n2*** with “1” (numeric integer one) and put the value in ***DATA1***;

b) case of Table; TI**( )**(integer) or TR**( )**(real):

In this case, replace ***n2*** with the numeric calculated from Equations (1) and (2):

$$\mathbf{n2} = \mathbf{2} + L_i * 2 \qquad \text{when n1} = 1 \tag{1}$$

$$\mathbf{n2} = \mathbf{n1} + \Sigma L_i + \Pi L_i \qquad \text{when n1} > 1 \tag{2}$$

where L_i is the number of lines for ith parameter in the table.

The DATA of the parameter designated as ***parameter name*** is an array of data corresponding to each increment of the data of the related parameters. The array of data is given in the same sequence for the order of the related parameter.

The physical dimension (unit) of the related parameters shall be given in the same way as in (g) mentioned below.

EXAMPLE 1 The case of n1 = 1.

In the case of n1 = 1, the values D_1 to D_4 of the parameter **a1** are given relative to a parameter **b1**, as shown in Table A.1; the coded data are shown:

$ISO; $example; ; ; **a1**; 1; **b1**; TI( ); 0; ; 0; 10;

1, 4, $b1_1$, $b1_2$, $b1_3$, $b1_4$, D_1, D_2, D_3, D_4

Table A.1 — One-dimensional table

a1	**b1**			
	$b1_1$	**$b1_2$**	**$b1_3$**	**$b1_4$**
	D_1	D_2	D_3	D_4

EXAMPLE 2 The case of n1 = 2.

In the case of n1 = 2, the values D_1 to D_8 of **a1** are given in relation to **b1** and **b2** as shown in Table A.2; the coded data are shown:

$ISO; $example; ; ; a1; 2; b1, b2; TI( ); 0; ; 0; 16;

2, 4, $b1_1$, $b1_2$, $b2_1$, $b2_2$, $b2_3$, $b2_4$, D_1, D_2, D_3, D_4, D_5, D_6, D_7, D_8

Table A.2 — Two-dimensional table

a1		**b2**			
		$b2_1$	**$b2_2$**	**$b2_3$**	**$b2_4$**
b1	$b1_1$	D_1	D_2	D_3	D_4
	$b1_2$	D_5	D_6	D_7	D_8

c) case of CH( ): In this case, the type of DATA is a character string;

d) case of DAY( ): In this case, the type of DATA is the date expressed as

yyyy-mm-dd-hh.mm.ss.nnnnnn

EXAMPLE 3 1998-09-12-15.25.33.000000.

e) case where the parameter has the value "0.0.0.0": In this case, ***Q(name)*** shall be replaced by ***CDIC(name)*** which is recognized as the dictionary for the parameter values of non-numeric explanations. The list of non-numerical values that can be selected by the parameter shall be given in the DATA.

In the case where there is a need to explain the details of the specification of the values, ***name*** shall be used, where ***name*** is the file name in which the explanation about them may be given.

f) case where the value or status of the parameter is defined by a function: In this case, ***Q(name)*** shall be replaced by ***F(name)***. The ***name*** in ***F(name)*** is the file name which describes an algorithm of the function. The description of the function shall have the definition of Input, Output, parameters for processing and processing itself similar to a programming algorithm.

g) case of defining the physical dimension of parameter: In this case, ***Q(name)*** shall be replaced by ***DDIC(name)***. The ***name*** in ***DDIC(name)*** is the file name which in addition explains the meaning of the dimension and definition. If the file is not needed, "name" can be omitted (see Annex C.)

h) case where the parameter has the value "0.0.0.2": In this case, ***Q(name)*** shall be replaced by ***DDIC(name)*** which is recognized as the dictionary for the units of the parameter having numeric data (see Annex D). The list of units that can be selected shall be given in the DATA.

case where there is a need to explain the details about the specification of the units: In this case, ***name*** shall be used, where ***name*** is the file name in which the explanation about them may be given.

case of defining a function other than (a) through (g): In this case, "***Q***" in ***Q(name)*** must be replaced by symbol characters other than VI, VR, TI, TR, CH, DAY, CDIC, F and DDIC; then the 'name' should be set in ***Q(name)*** which is the name of the file which describes the function in detail.

DIM This term gives a way of describing the unit of the parameter as a number.

This shall not be omitted, except in the case that ***Q(name)*** equals **CDIC**. When ***Q(name)*** is **CDIC(name)**, this term will be neglected even if it exists in the record of the data.

DIM= 0 If ***Q(name)*** **is DDIC(name)**, then this is for defining the dimension. [See ***Q(name)*** explanation in A.1 g)].

DIM= 1 In this case, index numbers for principal unit ***DIML*** to ***DIMCD*** shall be given. If the parameter is non dimensional, every index number shall be set to “0”.

DIM= 2 Name for Dimensions (see ***DIMN***); the name of the unit shall be written in ***DIMN***.

DIM= 3 In this case, the description about dimension (physical unit) can be omitted. The dimension should be defined in another record having the same ***parameter name*** and ***DDIC*** label as ***Q(name)*** in the common AMPAC dimension dictionary or in the same subset. This method can reduce the redundancy of AMPAC records when the same parameter appears many times in the same subset. The definition of dimension in the subset shall have higher priority over the common dimensional dictionary.

DIMN The name of the unit defined in ISO 1000, the AMPAC common dictionary and user-defined dimension. This term is effectively used only when the content of ***DIM*** equals 0 or 2. If ***DIM*** is equal to 1 or 3, ***DIMN*** can be ignored The user-defined dimension shall be defined in its own subset by using ***DDIC(name)*** and ***DIM***=0.

EXAMPLE **N, Pa, J, V, F** or like ‘dpi’ (user-defined) and etc.

When ***Q(name)*** is ***CDIC(name)***, the contents in this term will be ignored, even if present.

DIML, DIMM, DIMT, DIMA, DIMK, DIMMOL, DIMCD

These are exponential index numbers for the base of the unit according to ISO 1000. These terms are effectively used only when the content of ***DIM*** equals 0 or 1. If ***DIM*** equals 2 or 3, ***DIML*** to ***DIMCD*** might be ignored. The order of a row of the element shall not be rearranged. The notation of each base of exponent is as follows:

DIML length, expressed in metres;

DIMM mass, expressed in kilograms;

DIMT time, expressed in seconds;

DIMA electric current, expressed in amperes;

DIMK temperature, expressed in kelvin;

DIMMOL amount of substance, expressed in moles;

DIMCD luminous intensity, expressed in candelas.

EXAMPLE 4 ***DIML***=**1**, ***DIMT***= –**1** means velocity.

EXAMPLE 5 ***DIMT***=**1**, ***DIMA***=**1** means electric charge.

DIM10 This is the exponent for the DATA (e.g. 3 for k (10^3), 6 for M (10^6), –6 for μ (10^{-6}), etc.). If the value is given by a numeric number, the exponent of 10 shall be given. The character “asterisk” (2/A of ISO/IEC 646) shall be used as the multiplier, and the details indicating the unit shall be described in the file designated by the “name” in ***DDIC(name)***, when the multiplier has a complicated number.

n2 This is the number of the data array ***DATA1, DATA2, … , DATAn2***.

DATA1, DATA2, … , DATAn2

These are the values of the parameters designated by ***parameter name***. When the number of data points is equal to “n2”, the n2 data shall be described with the separator comma (‘,’).

EXAMPLE 6 DATA,DATA2,DATA3,..., DATAn12

A.2 Representation of an object in the database

An object, such as material, a product, a machine or machine element and even the process or workflow, can be specified by using an appropriate set of coded parameter data, since the object has some parameters describing properties, characteristics, and also connections to other parameters. The group of parameter data specifying an object is named a “subset” of Database AMPAC. The subset consists of one or more parameter data having the same ‘***manufacturer***’ and ‘***model identifier***’ code.

A.3 Structure of the Database AMPAC subset file

A.3.1 Character code set

To define the AMPAC subset database file, the Database AMPAC Version and the name of the character code set used in the subset shall be written in the first line and “End of data” shall be written in the last line, as follows:

AMPAC Ver.xx.xx;Used Character Code Set [;user option]
Parameter code expressions
End of data

The first line shall be written in ASCII code to detect the code-set used in the file.

EXAMPLE 7 AMPAC Ver.03.10;Uni Code;Japanese
(AMPAC parameter expressions)
End of data

A.3.2 Data type expression

If the first letter in a token enclosed by a “semicolon” or “colon” has one of the following letters, the following letters shall have the data types:

“$” **String**

EXAMPLE 8 …;**$ampac**;…..

none **numeric**

EXAMPLE 9 …;**12345**;……

The above rule shall be applied only for the parts in the AMPAC contents “manufacturer”, “model identifier”, “information group”, ”parameter name”, ”reference” , ”identifier in parameter” and ”PR”.

The part “***n1***”, “***n2***”, ***DIM***”, ***DIML***…***DIMCD***” and “***DIM10***” shall only have numeric values, while “***Q(name)***” and “***DIMN***” shall only have a data type “character string”. The data type for “DATA1 to DATAn2” is given by the definition ***Q(name)***.

Annex B
(informative)

Examples of a Database AMPAC common dictionary

AMPAC code provides the ability for making a list (dictionary) from which a parameter value can be selected. The parameter having the code "0.0.0.0" and the following reference is linked to a selection list for that parameter.

Example 1 The type of stitches used for "book binding" are listed for the parameter "type of stitch" which is followed by the "0.0.0.0"code.

```
AMPAC Ver.01.00;ISO/IEC 646
   $IPTS_WG4;$COM_CDIC;$Design_bookbinding;0.0.0.0:
   10.16.10.2 ($type of stitch):;;0;;CDIC( );1;;;0;
   6;sewing,saddle stitch,side stitch,perfect binding,notch binding,lose leaf binding
End of data
```

Example 2 The data set for the common dictionary for "design process instructions" is shown in Table B.1 and the corresponding AMPAC coding that follows:

```
AMPAC Ver.01.00;ISO/IEC 646
   $IPTS_WG4;$COM_CDIC;$Design_outline_of_products;0.0.0.0:
      10.2.6.12 ($kind of products):;;0;;CDIC( );0;;;;
      15;newspaper,magazine,book,text book,catalog,pamphlet,poster,leaflet,map,
      business_form,bond,bbag,carton(pacaging),flexible packaging,interior decorative sheet
   $IPTS_WG4;$COM_CDIC;$Design_object_manuscript;0..0.0.0:
      10.6.4.8 ($purpose of element text):;;0;;CDIC( );0;;;;
      3; title,caption,body
   $IPTS_WG4;$COM_CDIC;$Design_object_vector;0.0.0.0:
      10.6.8.26 ($shape of outer flame):;;0;;CDIC( );0;;;;
      8; triangle,rectangle,square,lozenge,round,polygon,ellipse,file
   $IPTS_WG4;$COM_CDIC;$Design_bookbinding;0.0.0.0:
      10.16.6.2 ($type of folding):;;0;;CDIC( );0;;;;
      5;right angle,letter fold,parallel fold,accordion fold,gate fold
   $IPTS_WG4;$COM_CDIC;$Design_bookbinding;0.0.0.0:
      10.16.18.4 ($kind of cover feature):;;0;;CDIC( );0;;;;
      5;glue-on cover,two-piece cover,three- piece cover,cut flash cover,creasing cover
   $IPTS_WG4;$COM_CDIC;$Design_bookbinding;0..0.0.0:
      10.16.18.2 ($type of cover paper):;;0;;CDIC( );0;;;;
      2; hard cover,soft cover
   $IPTS_WG4;$COM_CDIC;$Design_bookbinding;0.0.0.0:
      10.2.6.124 ($type of back):;;0;;CDIC( );0;;;;
      4;round back,squqre back,hollow back,tight back
   $IPTS_WG4;$COM_CDIC;$Design_bookbinding;0.0.0.0:
      10.2.6.116 ($type of case):;;0;;CDIC( );0;;;;
      2;slip case,folding case
   $IPTS_WG4;$COM_CDDIC;$Design_bookbinding;0.0.0.0:
      10.2.6.72 ($type of bookbinding):;;0;;CDIC( );0;;;;
      2;case bound,non-case bound
End of data
```

Table B.1 — Possible value list for instruction parameter appearing in design

Parameter	List of possible values for the parameter
kind of products	newspaper, magazine, book, text book, catalog, pamphlet, poster, leaflet, map, business form, bond, bag, carton(packaging), flexible packaging, interior decorative sheet
purpose of element text	title, caption, body
shape of outer flame	triangle, rectangle, square, lozenge, round, polygon, ellipse, file
type of folding	right angle, letter fold, parallel fold, accordion fold, gate fold
kind of cover feature	glue-on cover, two-piece cover, three- piece cover, cut flash cover, creasing cover
type of cover paper	hard cover, soft cover
type of back	round back, square back, hollow back, tight back
type of case	slip case, folding case
type of bookbinding	case bound, non-case bound

Annex C
(informative)

Defining the unit of a parameter — Example 1

Database AMPAC will also provide a normative set of common unit definitions. This set will be given with the common AMPAC database as explained here in order to reduce redundancy in the AMPAC data file. Dimensions can be defined for common purpose in each site, too.

The name appearing inside ( ) of DDIC( ) references the file name (including the directory and/or URL) which contains the method of defining the physical dimension of the unit including the method of measurement for the parameter. The file will be in the same site as the subset by default, although other sites can be indicated by describing them in the named file.

An example of the dictionary for the dimensions used for paper is shown with the explanation of Database AMPAC (see Annex A). Each parameter of "paper" has physical and/or non-physical information and/or a name for the unit.

AMPAC Ver.03.10;Uni Code;Japanese

$IPTS_WG4;$COM_DIC;$Paper_CH_general;**18.2.2.4 ($basis weight)**;;0;;

DDIC( );0;g/m**2;-2,1,0,0,0,0,0;-3;;

$IPTS_WG4;$COM_DIC;$Paper_CH_general;**18.2.2.6 ($calliper)**;;0;;DDIC( );0;μm;1,0,0,0,0,0,0;-6;;

$IPTS_WG4;$COM_DIC;$Paper_CH_general;**18.2.2.8 ($apparent sheet density)**;;0;;

DDIC( );0;g/cm**3;-3,1,0,0,0,0,0;-3;;

$IPTS_WG4;$COM_DIC;$Paper_CH_general;**18.2.2.10 ($moisture content)**;;0;;DDIC( );2;%;;0;;

$IPTS_WG4;$COM_DIC;$Paper_CH_general;**18.2.2.12 ($ash content)**;;0;;DDIC( );2;%;;0;;

$IPTS_WG4;$COM_DIC;$Paper_CH_optical;**18.2.20.2 ($Hunter brightness FS)**;;0;;DDIC( );2;%;;0;;

$IPTS_WG4;$COM_DIC;$Paper_CH_optical;**18.2.20.6 ($ISO brightness FS)**;;0;;DDIC( );2;%;;0;;

$IPTS_WG4;$COM_DIC;$Paper_CH_optical;**18.2.20.14($CIE whiteness FS)**;;0;;DDIC( );1;;0,0,0,0,0,0,0;0;;

$IPTS_WG4;$COM_DIC;$Paper_CH_optical;**18.2.20.18 ($spectral reflectance factor FS)**;;0;;

DDIC( );1;;0,0,0,0,0,0,0;0;;

$IPTS_WG4;$COM_DIC;$Paper_CH_optical;**18.2.20.22 ($D65/10,X10 FS)**;;0;;DDIC( );1;;0,0,0,0,0,0,0;0;;

$IPTS_WG4;$COM_DIC;$Paper_CH_optical;**18.2.20.26 ($D65/10,Y10 FS)**;;0;;DDIC( );1;;0,0,0,0,0,0,0;0;;

$IPTS_WG4;$COM_DIC;$Paper_CH_optical;**18.2.20.28 ($D65/10,Z10 FS)**;;0;;DDIC( );1;;0,0,0,0,0,0,0;0;;

$IPTS_WG4;$COM_DIC;$Paper_CH_optical;**18.2.20.46 ($D65/10,L* FS)**;;0;;DDIC( );1;;0,0,0,0,0,0,0;0;;

$IPTS_WG4;$COM_DIC;$Paper_CH_optical;**18.2.20.50 ($D65/10,a* FS)**;;0;;DDIC( );1;;0,0,0,0,0,0,0;0;;

$IPTS_WG4;$COM_DIC;$Paper_CH_optical;**18.2.20.54 ($D65/10,b* FS)**;;0;;DDIC( );1;;0,0,0,0,0,0,0;0;;

$IPTS_WG4;$COM_DIC;$Paper_CH_optical;**18.2.20.82 ($opacity)**;;0;;DDIC( );2;%;;0;;

$IPTS_WG4;$COM_DIC;$Paper_CH_structure;**18.2.26.10 ($mean diameter of porous)**;;0;;

DDIC( );0;μm;1,0,0,0,0,0,0;-6;;

$IPTS_WG4;$COM_DIC;$Paper_CH_structure;**18.2.26.12 ($porosity)**;;0;;DDIC( );2;%;;0;;

End of data

Annex D
(informative)

Defining the unit of a parameter — Example 2

In Database AMPAC, a set of units having a different name but the same physical meaning can be described. The appropriate choice of units can be achieved by using the list of this set. The set will be given with the parameters in the common AMPAC database as explained here, in order to reduce redundancy in the AMPAC data file. Dimensions can also be defined for a common purpose in each site.

The name appearing inside ( ) of DDIC( ) references the file name (including the directory and/or URL) which contains the method of defining the physical dimension of the unit, including the method of measurement for the parameter. The file will be in the same site as the subset by default, although other sites can be indicated by describing them in the named file.

An example of the list of units having several explanations for same physical meaning by using Database AMPAC description is shown in Annex A.

```
AMPAC Ver.1.0;Uni Code;Japanese
  $IPTS_WG3;$COM_DDIC;$Unit_Dictionary;0.0.0.2:
     10.4.2.10 ($width of page):;;0;;
     DDIC( );0;;;;4;µm, mm,pixel,inch
  $IPTS_WG3;$COM_DDIC;$Unit_Dictionary;0.0.0.2:
     10.4.2.12 ($length of page):;;0;;
     DDIC( );0;;;;4;µm, mm,pixel,inch
  $IPTS_WG3;$COM_DDIC;$Unit_Dictionary;0.0.0.2:
     10.4.4.14 ($x-coordinate of each element of picture location):;;0;;
     DDIC( );0;;;;4;µm, mm, pixel, inch
  $IPTS_WG3;$COM_DDIC;$Unit_Dictionary;0.0.0.2:
     10.4.4.16 ($y-coordinate of each element of picture location):;;0;;
     DDIC( );0;;;;4;µm, mm, pixel, inch
  $IPTS_WG3;$COM_DDIC;$Unit_Dictionary;0.0.0.2:
     10.4.4.24 ($x-coordinate of each element of text location):;;0;;
     DDIC( );0;;;;6;µm, mm, pixel, inch, Q, point
  $IPTS_WG3;$COM_DDIC;$Unit_Dictionary;0.0.0.2:
     10.4.4.26 ($y-coordinate of each element of text location):;;0;;
     DDIC( );0;;;;7;µm, mm, pixel, inch, inch, Q, point
  $IPTS_WG3;$COM_DDIC;$Unit_Dictionary;0.0.0.2:
     10.6.6.14 ($resolution of element CT picture):;;0;;
     DDIC( );0;;;;2;dpi(1/25.4mm), 1/mm
  $IPTS_WG3;$COM_DDIC;$Unit_Dictionary;0.0.0.2:
     10.6.8.14 ($resolution of LA element):;;0;;
     DDIC( );0;;;;2;dpi(1/25.4mm), 1/mm
End of data
```

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