INTERNATIONAL ORGANIZATION FOR STANDARDIZATION• МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ• ORGANISATION INTERNATIONALE DE NORMALISATION

Industrial automation systems and integration — Product data representation and exchange —

Part 21:
Implementation methods: Clear text encoding of the exchange structure

TECHNICAL CORRIGENDUM 1

Systèmes d'automatisation industrielle et intégration — Représentation et échange de données de produits —

Partie 21: Méthodes de mise en application: Encodage en texte clair des fichiers d'échange

RECTIFICATIF TECHNIQUE 1

Technical Corrigendum 1 to International Standard ISO 10303-21:1994 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration,* Subcommittee SC 4, *Industrial data and global manufacturing languages.*

Introduction

The modifications to the text of ISO 10303-21:1994 are of four kinds. Each modification is identified as to which kind it represents and is marked with a diamond (♦). The four kinds of modifications are:

— CHANGE: A change to the requirements of ISO 10303-21:1994. Such a modification affects the conformance of implementations.

— Correction: A modification to the text which corrects an inaccurate specification or completes an incomplete specification. In general, such a modification should not affect the conformance of implementations, although implementations based on literal interpretations of erroneous text might have to be corrected.

— Clarification: A modification to the text to remove ambiguities, incorrect implications, and other wording which makes the determination of the requirements difficult. Such a modification should not affect conformance of implementations, unless the implementors were confused by the previous texts.

— Editorial: A modification to the text to delete redundancies and unused subclauses, or to move a misplaced specification into the proper clause.

In addition, a compendium of typographical corrections to ISO 10303-21:1994 is included.

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Modifications to the text of ISO 10303-21:1994

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Introduction

♦ (Correction) In paragraph 3, sentence 1, replace "This part of ISO 10303 specifies a mechanism that allows product data representation using the EXPRESS language, ..." with the following:

This part of ISO 10303 specifies a mechanism that allows product data described in the EXPRESS language, ...

Page 1

Clause 2

♦ (Correction) After ISO 8601, add the following:

ISO/IEC 8824-1:1994, *Information technology -- Open Systems Interconnection -- Abstract Syntax Notation One (ASN.1) -- Part 1: Specification of basic notation.*

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Subclause 3.5

♦ (Editorial) Delete 3.5 and renumber 3.6 accordingly.

Subclause 3.6.2

♦ (Correction) Replace (former) 3.6.2 with the following and renumber per previous instruction:

3.5.2 clear text encoding: the encoding of information, using a sequence of codes for characters in the basic alphabet.

Subclause 3.6.5

♦ (Editorial) Delete (former) 3.6.5 and renumber accordingly.

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Subclause 5.1

♦ (Clarification) In paragraph 1, sentence 3, add the following to the end of the sentence:

to the exchange structure syntax

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Subclause 5.3

♦ (Correction) In paragraph 3, sentence 1 (beginning "Two classes of syntactical conformance ..."), replace "depending on the method chosen for the encoding of entity instances whose entity types are subtypes/supertypes (see 11.2.5)." with the following:

depending on the method chosen for the encoding of complex entity instances (see 11.2.5).

Subclause 6.1

♦ (Editorial) Delete sentence 3, (beginning "Literals").

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Subclause 6.3

♦ (Clarification) In table 3, change the production for ENTITY_INSTANCE to:

```
ENTITY_INSTANCE = SIMPLE_ENTITY_INSTANCE |
    COMPLEX_ENTITY_INSTANCE.
SIMPLE_ENTITY_INSTANCE =
    ENTITY_INSTANCE_NAME "=" [SCOPE] SIMPLE_RECORD ";" .
COMPLEX_ENTITY_INSTANCE =
    ENTITY_INSTANCE_NAME "=" [SCOPE] SUBSUPER_RECORD ";" .
```

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Subclause 6.6

♦ (Clarification) In paragraph 2, sentence 1, after "A comment shall be encoded as a *solidus asterisk* ("/*") followed by any number of characters" insert the following:

from the basic alphabet

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Subclause 6.7

♦ (Editorial) Delete 6.7.

Clause 7

♦ (Clarification) In paragraph 1, sentence 1, add the following at the end of the sentence:

encoding

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Subclause 7.1

♦ (Correction) At the end of 7.1, add the following:

The special token *dollar sign* ("$") is used to represent an object whose value is not provided in the exchange structure.

The special token *asterisk* ("*") is used to represent an object whose value is not provided in the exchange structure but can be derived from other values according to rules given in the EXPRESS schema (see 11.2.6).

The special tokens *semicolon* (";"), *parentheses* ("(", ")"), *comma* (",") and *solidus* ("/") are used to punctuate the exchange structure.

Subclause 7.3

♦ (Clarification) In the title and sentence 1, replace "simple data types" with the following

simple data type encodings

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Clause 7.3.3.1

♦ (Clarification) Replace paragraph 1 with the following:

In ISO 8859, G(x/y) is the notation for the character in "column" x "row" y, i.e., code value (16 • x) + y, in the code table. Each part of ISO 8859 includes the basic alphabet (see 6.2) as positions G(02/00) through G(07/14). The various parts of ISO 8859 differ in the symbols of the extended character set — positions G(10/00) through G(15/14). To include characters from the extended character set in a string requires the use of control directives.

♦ Replace paragraph 2, sentence, 1 with the following:

The PAGE control directive — *reverse solidus capital letter S reverse solidus* ("\S\") CHARACTER (see table 4) — is used within a string to allow a character in the basic alphabet to represent the character in the corresponding position in the extended alphabet. The PAGE control directive shall be interpreted in the string as the single character $G((x+8)/y)$, where $G(x/y)$ is the basic alphabet character following the "\S\". That is, if the basic alphabet character has code value v, it shall be interpreted as the character with code value v + 128.

♦ The remaining text of paragraph 2 forms a new paragraph.

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Clause 8

♦ (Correction) Replace sentence 2 with the following:

A LIST is a (possibly empty) sequence of PARAMETERs, each of which may be:

   — a simple type encoding, as described in 7.3, or

   — the special token *dollar sign* ("$"), or

   — a TYPED_PARAMETER, representing an instance of a select type (see 11.1.8), or

   — a LIST, representing an instance of a (nested) structured type.

A given LIST may contain more than one of the above forms.

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Subclause 9.2.1

♦ **(CHANGE)** Under "Attribute Descriptions", replace entire text of **implementation_level** and the following note with the following:

implementation_level: an identification of the specification to which the encoding in this exchange structure conforms and any conformance options employed in that encoding. The value of this attribute shall indicate conformance to this version of this part of ISO 10303 by having either the value "2;1" or the value "2;2". The value for exchange structures adhering to conformance class 1 shall be "2;1". The value for exchange structures adhering to conformance class 2 shall be "2;2".

NOTES

1 - Conformance classes 1 and 2 are defined in 11.2.5.

2 - The general form for the value is "v;cc", where v is the version number of this part of ISO 10303, as specified in annex C, and cc is the encoding of conformance class. Future versions of this part of ISO 10303 may specify additional values for v and cc.

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Subclause 9.2.3

♦ (Clarification) In paragraph 3, sentence 1, replace the phrase "be encoded as specified" with the following:

have the form specified

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Subclause 9.3

♦ (Clarification) Replace list item b) with the following:

b) The attributes of user-defined header section entities shall have EXPRESS data types and shall be mapped to the header section as specified in clause 11.

Clause 10

♦ (Clarification) In paragraph 1, sentence 3, replace the phrase "instances of entities that correspond to the EXPRESS schema" with the following:

instances of entity data types defined by the EXPRESS schema

Subclause 10.1

♦ (Editorial) Replace the title of the subclause with the following:

10.1 Data section entity instances.

♦ (Clarification) In paragraph 1, replace sentence 1 with the following:

Each entity instance shall be mapped to an ENTITY_INSTANCE (see table 3) in the data section, as specified in 11.2.

♦ (Correction) In paragraph 1, replace the last sentence with the following:

An entity instance name may be referenced before it is defined by an ENTITY_INSTANCE in the exchange structure.

♦ (Correction) Delete paragraph 2.

Subclause 10.2

♦ (Editorial) Delete 10.2 and renumber accordingly.

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Subclause 10.3

♦ (Correction) In (former) 10.3, sentence 1, replace "and for defining existence relationships among entities" with the following:

and for defining existence relationships among entity instances

Subclause 10.3.1

♦ (Clarification) In (former) 10.3.1, paragraph 1, replace sentences 3 and 4 (beginning "If the SCOPE structure is used") with the following:

In either form of ENTITY_INSTANCE, if the SCOPE structure is used, it shall appear immediately after the *equal sign* ("=").

Subclause 10.3.3

♦ (Correction) Replace the entire text of (former) 10.3.3 including the examples with the following and renumber:

10.2.3 Behaviour

An EXPRESS schema specifies entity data types and, by having attributes that reference other entity data types, also establishes relationships among entity data types, and corresponding relationships among the instances of those data types. In addition to these relationships, the exchange structure can convey existence dependencies among entity instances.

An entity instance B is said to be "existence-dependent" on an entity instance A, if B can exist only when A exists. Existence dependence may be independent of the data types of instances A and B, and it may be independent of any reference between the instances A and B.

The entity instance described by the ENTITY_INSTANCE in which the SCOPE structure appears is said to be the "owner" of the scope, and all entity instances defined within the SCOPE structure are said to be "in the scope of" the owner. Every entity instance defined within a SCOPE structure shall be existence-dependent on the owner. The SCOPE structure shall contain all the entity instances that are existence-dependent on the owner instance.

NOTE - Using "population" to mean the collection of entity instances described by an exchange structure, if instance B is existence-dependent on instance A, and A is (later) deleted from the population, then B should also be deleted from that population.

EXAMPLES

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```
#1 = &SCOPE
#2 = POINT (0.0,0.0,0.0);
#3 = POINT (0.0,1.0,0.0);
#4 = POINT (3.0,1.0,0.0);
#5 = LINE (#2,#3);
#6 = LINE (#3,#4);
#7 = LINE (#4,#2);
ENDSCOPE TRIANG(#5,#6,#7);
```

Entity instance #1 of type TRIANG is defined by three LINE instances. The LINE instances (#5,#6,#7) are all in the scope of instance #1 and it can therefore be inferred that they are existence-dependent on instance #1. The POINT instances that define the LINEs are also in the scope of instance #1 and are dependent on it for their existence. The POINT entity instance names are available to be referenced in the LINE instances, because they are in the same SCOPE.

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```
#1  = &SCOPE
#12 = PART ('PART 74A',$,$,$);
#13 = PART ('PART 68B',$,$,$);
#14 = PART ('PART 12C',$,$,$);
      .
      .
      .
ENDSCOPE /#13, #14/ ASMBLY ((#12, #13),$,$,$);
#15 = APROVL ((#13), 'JOHN SMITH APPROVAL AUTHORITY');
```

PART entity instances #13 and #14 are exported from the SCOPE structure of ASMBLY entity instance #1. This makes it possible for entity instance #13 to be referenced in an attribute of APROVL entity instance #15, even though instance #15 is outside the scope of instance #1. In this case, PART instance #13 is existence-dependent on ASMBLY instance #1, but is the subject of an "independent" APROVL object.

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Clause 11

♦ (Clarification) Replace paragraphs 1 and 2 with the following:

This clause describes how instances of data types defined in the EXPRESS language are mapped to the exchange structure.

The EXPRESS language includes TYPE and ENTITY declarations, CONSTANT declarations, constraint specifications and algorithm descriptions. Only instances of data types, as defined by EXPRESS data types and TYPE and ENTITY declarations, are mapped to the exchange structure. Other elements of the language are not mapped to the exchange structure.

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♦ (Correction) In table 5:

Replace: `"ENTITY          entity"` with `"ENTITY          entity instance"`

Delete: `"ENTITY AS SUPERTYPE"`

Add: `"INVERSE          NO INSTANTIATION"`
`"NUMBER          real"`
`"UNIQUE rule      NO INSTANTIATION"`

Subclause 11.1.1.1

♦ (Clarification) Replace the phrase "The EXPRESS element of INTEGER" with the following:

Values of the EXPRESS data type INTEGER

Subclause 11.1.1.2

♦ (Clarification) Replace the phrase "The EXPRESS element of STRING" with the following:

Values of the EXPRESS data type STRING

Subclause 11.1.1.3

♦ (Clarification) In sentence 1, replace the phrase "The EXPRESS element of BOOLEAN" with the following:

Values of the EXPRESS data type BOOLEAN

♦In sentence 2, replace the phrase "The EXPRESS element of BOOLEAN" with the following:

The EXPRESS data type BOOLEAN

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Subclause 11.1.1.4

♦(Clarification) In sentence 1, replace the phrase "The EXPRESS element of LOGICAL" with the following:

Values of the EXPRESS data type LOGICAL

♦In sentence 2, replace the phrase "The EXPRESS element of LOGICAL" with the following:

The EXPRESS data type LOGICAL

Subclause 11.1.1.5

♦(Clarification) Replace the phrase "The EXPRESS element of REAL" with the following:

Values of the EXPRESS data type REAL

♦(Correction) In example 16, replace paragraph 2 with the following:

Sample instance in the data section:

```
    #2 = WIDGET(99, 99999, 'ABC', 'ABCDEFG', .T., .F., 9., 1.2345);
          ^       ^      ^        ^         ^    ^    ^     ^
          |       |      |        |         |    |    |     |
          |       |      |        |         |    |    |     |
          A       B      C        D         E    F    G     H
```

♦Replace paragraph 9 (beginning "G:") with the following:

G: r1 has the value of 9. in this entity instance. The precision specification does not affect the encoding.

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Subclause 11.1.1.6

♦(Clarification) Replace the phrase "The EXPRESS element of BINARY" with the following:

Values of the EXPRESS data type BINARY