Standard Norge framlegger følgende forslag til Teknisk Spesifikasjon til kritikk:

prSN-TS 3489 Implementation of IFD Library support in IFC

Høringsfrist: 2010-06-28

Dette er et forslag til Teknisk Spesifikasjon SN-TS 3489 til høring. Denne Tekniske Spesifikasjonen erstatter ingen annen Norsk Standard.

Forslaget er utarbeidet og anbefalt sendt ut til høring av IFD Library Norge Brukergruppe.

Brukergruppens mandat:

Brukergruppen har ansvaret for utvikling og vedlikehold av IFD Library i Norge. Ansvaret er knyttet til følgende hovedområder:

- Teknisk utvikling
- Populering (innhold)
- IFD Library Group
- Informasjon, demonstrasjon og implementering

Brukergruppen skal følge opp og diskutere saker som behandles på internasjonale møter i IFD Library Group og der det er relevant også saker som behandles i buildingSMART International. Komiteen skal følge opp de beslutninger som fattes i IFD Library Group.

Brukergruppen skal oppnevne norske representanter i IFD Library Group BMG (Business Management Group) og Technical Group (TG). De norske representantene i BMG og TG skal ivareta norske interesser i diskusjoner i IFD Library Group.

Brukergruppen skal spesielt følge opp utviklingen med innhold i Norge (populering) og har hovedansvaret for framdrift og kvalitet av dette arbeidet. Komiteen skal også sørge for at IFD Library Groups regler og retningslinjer blir fulgt i arbeidet med nytt innhold.

Brukergruppen skal også på vegne av IFD Library Group følge opp avtale om drifting av teknisk infrastruktur som utføres av EPM Technology AS og avtale om drifting av tekniske nettsider dev.ifd-library.org som utføres av Catenda.

Innkomne kommentarer vil bli behandlet av IFD Library Norge Brukergruppe.

Komiteens medlemmer er:

Eva **Andersen**, Norske Rørgrossisters Forening VVS
Håvard **Bell**, Catenda AS
Lars **Bjørkhaug**, Catenda AS
Aleksander **Bjaaland**, Holte Byggsafe
Jørgen **Gilberg**, Norsk Byggtjeneste AS
Bjarne **Haugland**, VA og VVS produsentene (VVP)
Per **Jæger**, Boligprodusentene
Henning **Kongsgård**, coBuilder AS

Chi Ho **Lau**, Jotne EPM Technology AS
Åsmund Kveim **Lie**, Nosyko AS
Jacob **Mehus**, Standard Norge, leder
Knud Fredrik **Mohn**, Forsvarsbygg
Rolv Møll **Nilsen**, Logiq
Inger **Ramstad**, Logiq
Jorulv **Rangnes**, Jotne EPM Technology AS
Jøns **Sjøgren**, Boligprodusentene
Steen **Sunesen**, buildingSMART
Arne **Tøn**, Jotne EPM Technology AS
Jens-Dag **Vatndal**, Elektroforeningen

SNs prosjektleder: Håvard Hjulstad (hhj@standard.no)

Gi dine kommentarer innen fristen for uttalelse på dette nettstedet, eller de kan sendes til:

Standard Norge
Postboks 242
1326 LYSAKER

Standards Norway is publicising this proposed Technical Specification for review:

prSN/TS 3489 Implementation of IFD Library support in IFC

Review deadline: 2010-06-28

This is a proposal for Technical Specification SN/TS 3489 for public review. This Technical Specification does not replace any previous Norwegian Standard.

The proposal has been developed by IFD Library Norway User Group.

The mandate of the User Group [unofficial translation from the Norwegian original]:

The User Group has the responsibility for development and maintenance of IFD Library in Norway. The responsibility relates to the following main areas:

- Technical development
- Population (content)
- IFD Library Group
- Information, demonstration and implementation

The User Group shall follow up and discuss matters that are being dealt with at international meetings of the IFD Library Group and, when relevant, even matters being dealt with by buildingSMART International. The User Group shall follow up decisions made by IFD Library Group.

The User Group shall appoint Norwegian representatives in the IFD Library Group BMG (Business Management Group) and Technical Group (TG). The Norwegian representatives in BMG and TG shall represent Norwegian interests in discussions of IFD Library Group.

The User Group shall in particular follow up content development in Norway (population) and has the main responsibility for progress and quality of this work. The User Group shall also make sure that the rules and guidelines of the IFD Library Group are adhered to in the work with new content.

The User Group shall furthermore on behalf IFD Library Group follow up the agreement relating to the operation of technical infrastructure handled by EPM Technology AS and the agreement relating to the operation of the technical web pages dev.ifd-library.org handled by Catenda.

All comments received will be discussed by IFD Library Norway User Group.

Members of the User Group are:

Eva **Andersen**, Norske Rørgrossisters Forening VVS
Håvard **Bell**, Catenda AS
Lars **Bjørkhaug**, Catenda AS
Aleksander **Bjaaland**, Holte Byggsafe
Jørgen **Gilberg**, Norsk Byggtjeneste AS
Bjarne **Haugland**, VA og VVS produsentene (VVP)
Per **Jæger**, Boligprodusentene
Henning **Kongsgård**, coBuilder AS

Chi Ho **Lau**, Jotne EPM Technology AS
Åsmund Kveim **Lie**, Nosyko AS
Jacob **Mehus**, Standards Norway, chair
Knud Fredrik **Mohn**, Forsvarsbygg
Rolv Møll **Nilsen**, Logiq
Inger **Ramstad**, Logiq
Jorulv **Rangnes**, Jotne EPM Technology AS
Jøns **Sjøgren**, Boligprodusentene
Steen **Sunesen**, buildingSMART
Arne **Tøn**, Jotne EPM Technology AS
Jens-Dag **Vatndal**, Elektroforeningen

SN's project manager: Håvard Hjulstad (hhj@standard.no)

Submit your comments before the review deadline on this web page, or send to:

Standards Norway
P.O.box 242
NO-1326 LYSAKER

Technical Specification

SN/TS 3489

1st edition April 2010

ICS
Language: English

Implementation of IFD Library support in IFC

Technical Specification SN/TS 3489

Implementation of IFD Library support in IFC

Content

Foreword

SN/TS 3489 was published in Xuary 2010. The document has been published in an English language version only.

SN/TS 3489 has been developed by IFD Library Norway User Group.

1 Scope

This Technical Specification explains implementational issues relating to IFD Library support in IFC. In particular, it standardizes the way IFD references shall be tagged in IFC 2x3 and 2x4, including concepts and examples for both classification and properties.

This Technical Specification is expected to be useful for software developers and technical personnel.

The description of IFC and IFD in general is not within the scope of this Technical Specification.

2 Normative references

The following reference 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 reference document (including any amendments) applies.

ISO 12006-2:2001 *Building construction — Organization of information about construction works — Part 2: Framework for classification of information*

ISO 12006-3:2007 *Building construction — Organization of information about construction works — Part 3: Framework for object-oriented information* [ISO/TC 59/SC 13/WG 6]

3 Terms and definitions

In this Technical Specification the following definitions apply:

3.1
object
any part of the perceivable or conceivable world
[ISO 12006-2]

3.2
property
characteristic attribute assigned to an object

NOTE In IFD Library specific values are assigned to each property.

3.3
tag, noun
markup that delimits an element
[ISO/IEC 16500-6:1999]

3.4
tag, verb
add tags to data

3.5
IFC
Industry Foundation Classes, an open data model specified in ISO/PAS 16739:2005.

3.6
IFD Library
International Framework for Dictionaries, a standard for terminology libraries or ontologies derived from international open standards, in particular ISO 12006-3:2007.

3.7
IFD-Guid
globally unique identifier used in IFD applications to provide unique reference

4 Tagging IFC objects and properties with IFD

4.1 General

In this chapter gives an overview of the four different ways to add IFD information both to objects and properties in IFC. These cases are first described with conceptual figures in 4.2. Implementers' agreements and description of what attributes to use and how is described in 4.2.5. In 4.4 STEP examples of all the cases are given as a reference. Together this gives guidance for both where one could expect to find IFD information in an IFC file an how to produce it.

4.2 Description of cases

4.2.1 Common for all cases

In the figures for all the cases an instance of IfcClassification is used to represent the IFD-Library reference. There should only be one instance of IfcClassification in the file (see also 4.2.5). An instance of IfcClassificationReference is used to represent the IFD-Guid and name. This instance can be reused for all objects you want to tag with the same IFD concept.

4.2.2 Case A: Tagging an IfcRoot object

The simplest case is where there are objects that are subtypes of IfcRoot and want to tag those objects. An instance of IfcClassificationReference is used to represent the IFD-Guid and name.

Example: Tag an instance of IfcWindow to indicate that this is a "hinged window".

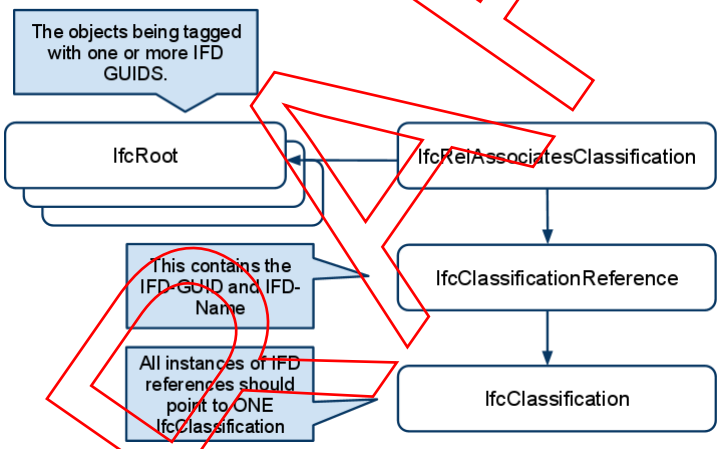

Figure 1 — Case A

4.2.3 Case B: Tagging an IfcRoot object using type reference

One can, and should if applicable, assign IFD-Guids through the type object rather than assigning IFD-Guids to objects directly. Examples of type objects include IfcSpaceType, IfcDoorStyle, IfcCoveringType, IfcWindowStyle and IfcFurnishingElementType.

Example: Tag all instances of a IfcWindow of the same type to be a "hinged window".

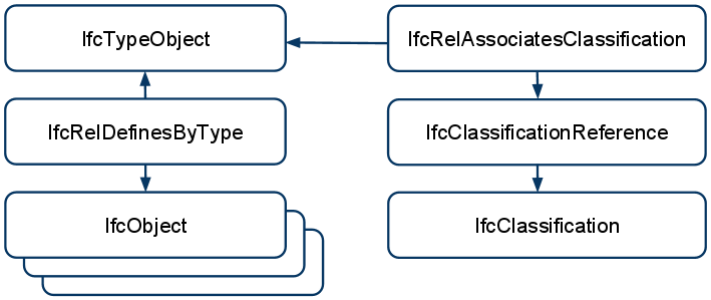

Figure 2 — Case B

4.2.4 Case C: Tagging an IfcProperty (name/type)

Properties defined in the IFC schema and user defined properties in particular, can be given IFD-Guids to define the exact what the property is about. This is done by adding an IfcPropertyReferenceValue with name “IfdProperty” and assigning it to the property being defined by the use of IfcPropertyDependencyRelationship. This allows for a mapping of user defined properties across systems even if the name of the property differs from one system or implementation to the other.

Example: Specify that value given for a property represents “module height”.

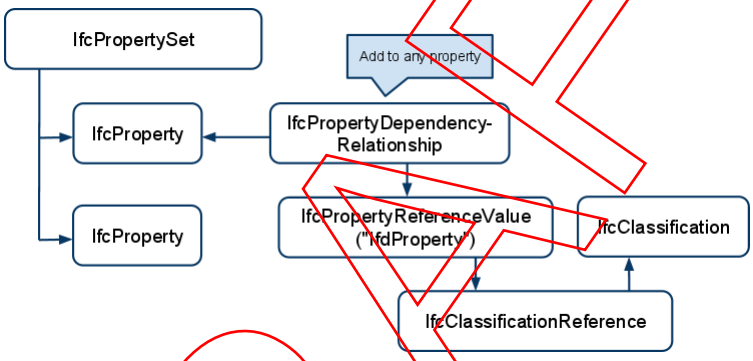

Figure 3 — Case C

4.2.5 Case D: Tagging an IfcProperty (name/type and value)

In a similar way we can tag the value of a property. The mechanism is identical to the example tagging the property. The only difference is the naming of the IfcPropertyDependencyRelationship. In this case the name will be “IfdValue”. Some IFD entities not only define a property but also a set of valid values for the property. This mechanism opens for the exchange of such values.

Example: Tag the type of a property to be “child proofing” and value to be true.

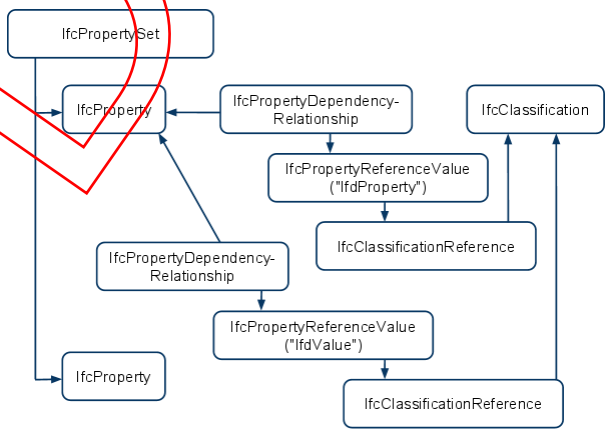

Figure 4 — Case D

4.3 Description of the needed IFC classes and attributes

The following notation is used in all tables:

4.3.1 Mandatory implementer agreements

There should only be one instance of the IfcClassification object representing the IFD Library.

The names/values given in orange must be given. Every IfcClassificationReference must have a label with value “www.ifd-library.org”.

4.3.2 Optional implementers’ recommendations

There should only be one IfcRelAssociatesClassification and IfcClassificationReference for each IFD-Guid you want to tag in your model. If you have two IfcWalls you would like to tag with the same IFD-Guid you create only one IfcRelAssociatesClassification and link to the two walls. If the same wall has a type object you should assign it to the type instead.

4.3.3 Explanation for terms used in the tables

- *Attribute name:* The IFC attributes for the given EXPRESS entity, e.g. IfcClassification.
- *Type:* The IFC type to use in attribute. If a type is given with another super type in parentheses () after, this means that the value in parentheses is the one defined in the IFC model, but for IFD tagging the specialized type is the one expected.
- *Mand/IFD:* Mandatory (M) or Optional (O) for assuring full IFD support.
- *Mand/IFC:* Mandatory (M) or Optional (O) in the IFC model.
- Value description and colour codes: If a value is given in orange, this means a fixed value that must be used. Values in pink are examples of IFD-values used.

Table 1 — IfcClassification
(used to represent the IFD library)

Attribute name	Type	Mand/IFD	Mand/IFC	Value description
Source	IfcLabel	M	O	“dev.ifd-library.org”
Edition	IfcLabel	M	M	Short name of the language used in this export. E.g. “en” for international English or “nb-NO” for Norwegian Bokmål
EditionDate	IfcCalendarDate	O	O	Could be used in an offline setting for the date synchronized with the online service
Name	IfcLabel	M	M	“IFD Library”

Table 2 — IfcClassificationReference
(used to represent an IFD concept – IFD-Guid and name)

Attribute name	Type	Mand/IFD	Mand/IFC	Value description
Location	IfcLabel	M	O	“www.ifd-library.org”
ItemReference	IfcIdentifier	M	O	The IfdGuid of the IFD concept
Name	IfcLabel	M	O	The IfdName of the IFD concept in preferred language, e.g. “Hinged window”
ReferencedSource	IfcClassification	M	O	Pointer to the IFD library definition

Table 3 — IfcRelAssociatesClassification
(used to relate an IFD concept to one or more IFC objects)

Attribute name	Type	Mand/IFD	Mand/IFC	Value description
GlobalId	IfcGlobalUniqueId	M	M	
OwnerHistory	IfcOwnerHistory	M	M	
Name	IfcLabel	M	O	"IfdRelationship"
Description	IfcText	O	O	
RelatedObjects	**SET** [1:?] **OF** IfcRoot	M	M	Pointer to one or more objects of subtype of IfcRoot (e.g. IfcDoor) that you want to tag with an IFD-Guid
RelatingClassification	IfcClassificationReference (IfcClassificationNotationSelect)	M	M	Pointer to the IFD classification reference containing the IFD-Guid

Table 4 — IfcPropertyReferenceValue
(used to make a property point to an IFD-Guid – IfcClassificationReference)

Attribute name	Type	Mand/IFD	Mand/IFC	Value description
Name	IfcIdentifier	M	M	"IfdProperty" or "IfdValue"
Description	IfcText	O	O	
UsageName	IfcLabel	O	O	
PropertyReference	IfcClassificationReference (IfcObjectReferenceSelect)	M	M	Pointer to the IFD classification reference containing the IFD-Guid

Table 5 — IfcPropertyDependencyRelationship
(used to relate any property to IFD – Case D)

Attribute name	Type	Mand/IFD	Mand/IFC	Value description
DependingProperty	IfcProperty	M	M	The property to tag
DependantProperty	IfcPropertyReferenceValue (IfcProperty)	M	M	Pointer to the property that points to the IFD-Guid
Name	IfcLabel	O	O	
Description	IfcText	O	O	
Expression	IfcText	O	O	

4.4 STEP file examples

This section gives examples of segments from Part21 STEP files for the different cases described in 4.2. These are not complete valid IFC files, but the parts needed for the cases.

4.4.1 Common for all cases

All cases below references the IfcClassification object which represents the IFD Library:

```
/* Create ifd library classification */
#6039=IFCCLASSIFICATION('IFD Library','en',$,'IFD Library');
```

Some of the examples also references an IfcWindow #78 and owner history #44 and should be created as normal.

4.4.2 Case A

Example: Tag an instance of IfcWindow to indicate that this is a “hinged window”.

```
/* Create a reference to the IFD concept */
#6040=IFCCLASSIFICATIONREFERENCE('www.ifd-library.org',
'3y9eg0FaOHtG0000PR1IRl','Hinged window',#6039);

/* Create a relation from IFD concept to the object (IfcWindow #78) */
#6041=IFCRELASSOCIATESCLASSIFICATION('21CJGs9Nr7Yxbg3jDdXDu_',#2,'IfdRelationship',$,(#78),#6040)
;
```

4.4.3 Case B

Example: Tag all instances of an IfcWindow of the same type (IfcWindowStyle) to be a “hinged window”:

```
/* Create a reference to the IFD concept */
#6040=IFCCLASSIFICATIONREFERENCE('www.ifd-library.org',
'3y9eg0FaOHtG0000PR1IRl','Hinged window',#6039);

/* Create a windowStyle and connect to window #78 */
#7000= IFCWINDOWSTYLE('3o$XIFpmD5swrzOhGSrTy8',#2, 'Fixed glazing',
$,$,$,$,$,.NOTDEFINED.,.SINGLE_PANEL.,.F.,.F.);
#7001=IFCRELDEFINESBYTYPE('348C6GbJb7Thki5llQxQ$z',#2,'',$,(#78),#7000);

/* Create a relation from IFD concept to the type object (IfdWindowStyle #7000) */
#6041=IFCRELASSOCIATESCLASSIFICATION('21CJGs9Nr7Yxbg3jDdXDu_',#2,
'IfdRelationship',$,(#7000),#6040);
```

4.4.4 Case C

Example: Specify that value given for a property represents “module height”.

```
/* Creates the propertySet and attach it to the window #78*/
#9042=IFCRELDEFINESBYPROPERTIES('35YdWMmwr4rQ61AZPsifP7',#2,$,$,(#78),#9043);
#9043=IFCPROPERTYSET('m35YdWMwr4rQ61AZPsifP7',#44,'Pset_With_IfcPropertyDependencyRelationship','
Hinged Window',(#9500));

/* Create a property where the property is defined in IFD, but not the value*/
#9500=IFCPROPERTYSINGLEVALUE('Module height',$, IFCIDENTIFIER('8M'),$);
#9501=IFCPROPERTYDEPENDENCYRELATIONSHIP(#9500,#9502,$,$,$);
#9502=IFCPROPERTYREFERENCEVALUE('IfdProperty',$,$, #9503);
#9503=IFCCLASSIFICATIONREFERENCE('www.ifd-library.org',
'0B3Jq0FaSHtG0000PR1IRl','Module height',#6039);
```

4.4.5 Case D

Example: Tag the type of a property to be “child proofing” and value to be true.

```
/* Creates the propertySet and attach it to the window #78*/
#9042=IFCRELDEFINESBYPROPERTIES('35YdWMmwr4rQ61AZPsifP7',#2,$,$,(#78),#9043);
#9043=IFCPROPERTYSET('m35YdWMwr4rQ61AZPsifP7',#44,'Pset_With_IfcPropertyDependencyRelationship','
Hinged Window',(#9600));

/* Create property where both property and value is defined in IFD and value description */
#9600=IFCPROPERTYSINGLEVALUE('Child proofing',$, IFCBOOLEAN(.T.),$);
#9601=IFCPROPERTYDEPENDENCYRELATIONSHIP(#9600,#9603,$,$,$);
#9602=IFCPROPERTYDEPENDENCYRELATIONSHIP(#9600,#9604,$,$,$);
#9603=IFCPROPERTYREFERENCEVALUE('IfdProperty',$,$, #9605);
#9604=IFCPROPERTYREFERENCEVALUE('IfdValue',$,$, #9606);
#9605=IFCCLASSIFICATIONREFERENCE('www.ifd-library.org',
'0Py__0FaSHtG0000PR1IRl','Child proofing',#6039);
#9606=IFCCLASSIFICATIONREFERENCE('www.ifd-library.org',
'3pZpg05FSHt00000PR1IRl','True',#6039);
```

Annex A
Viewer recommended implementation

In existing software today there are several ways to present a property and its value. This annex gives some recommendations on how to present the properties in a viewer

A.1 Properties as treeview

Property = IfcProperty.Name

Value = If IfcPropertyReferenceValue then lookup the referenced IfcClassificationReference.Name

Description = IfcProperty.Description

<Property>

- <IfcPropertyReferenceValue.Name> : <Value> : <Description>
- <IfcPropertyReferenceValue.Name> : <Value> : <Description>

An example is given in figure A1.

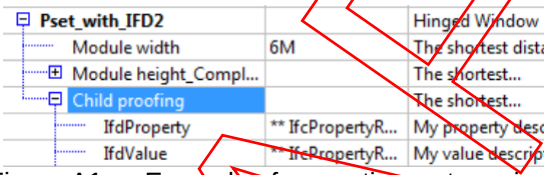

Figure A1 — Example of properties as tree view

A.2 Properties – flat (. notation)

Property = IfcProperty.Name + "." + IfcPropertyReferencevalue:Name.

Value = If IfcPropertyReferenceValue then lookup the referenced IfcClassificationReference.Name.

Description = IfcProperty.Description.

Table A1 — Pset_With_IFD – Hinged Window (IFC Propertyset)

Property	Value	Description
Child proofing.IfdProperty	Child proofing	
Child proofing.IfdValue	True	

A.3 Properties – flat (lookup notation)

Property = IfcProperty.Name

External reference =

ItemReference =IfcClassificationReference.ItemReference

Source = IfcClassification.Name

Edition = IfcClassification.Edition

Value = If IfcPropertyReferenceValue then lookup the referenced IfcClassificationReference.Name.

Description = IfcProperty.Description.

Table A2Properties – flat (lookup notation)

Pset_With_IFD – Hinged Window (IFC Propertyset)			
Property	**External reference**	**Value**	**Description**
Child proofing	ItemReference: 08gkC0FaSHtG0000PR1IRl Source: IFD Library Edition: [en]	True	(description from refrerenceValue description IfdProperty)

Annex B
EXPRESS examples

B.1 General

The intention is to build out this annex to include complete EXPRESS examples.

B.2 EXPRESS queries

- Query to add IFD tag to existing property
- Query to find IFD tag for property
- Query to return all IFD tags in model

B.3 Pseudo code for adding and finding IFD tags in an IFC model

- Query to add IFD tag to existing property

Look for IfcClassification instances with the name “IFD Library”. If it exists, get the IFD-Guid. If not, create it.

Look for all IfcPropertyReferenceValue instances by following the IfcClassificationReference relationships. Check if there exists an IfcPropertyReferenceValue instance with the same IFD-Guid as the one you want to tag with.

- Query to find IFD tag for property
- Query to return all IFD tags in model