INTERNATIONAL STANDARD

**ISO 12006-3**

First edition
2007-04-15

# Building construction — Organization of information about construction works —

## Part 3: Framework for object-oriented information



*Construction immobilière — Organisation de l'information des travaux de construction —*

*Partie 3: Schéma pour l'information basée sur l'objet*



Reference number
ISO 12006-3:2007(E)



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Published in Switzerland

 

# Contents

Page

# Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard ISO 12006-3 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 12006-3 was prepared by Technical Committee ISO/TC 59, *Building construction*, Subcommittee SC 13, *Organization of information about construction works*.



This first edition of ISO 12006-3 cancels and replaces ISO/PAS 12006-3:2001.

ISO 12006 consists of the following parts, under the general title *Building construction — Organization of information about construction works*:



— *Part 2: Framework for classification of information*

— *Part 3: Framework for object-oriented information*

# Introduction

The main part of ISO 12006-3 consists of the specification of a taxonomy model, which provides the ability to define concepts by means of properties, to group concepts, and to define relationships between concepts. Objects, collections and relationships are the basic entities of the model. The set of properties associated with an object provide the formal definition of the object as well as its typical behaviour. Properties have values, optionally expressed in units.

The role that an object is intended to play can be designated through the model and this provides the capability to define the context within which the object is used. Each object may have multiple names and this allows for its expression in terms of synonyms or in multiple languages. The language name of each object must always be given in English (the default language). An object may also be named in terms of the language of the location in which it is determined or used. Objects may be related to formal classification systems through the provision of references.

The model has one root entity from which the following three subtype entities inherit: objects, collections and the relationships between them. The root entity provides the ability to assign any set of names, labels, descriptions and references, in any language, to its derived types, as well as identifiers and dates.

Objects are divided into subjects, activities, actors, units, values and measures with units and properties. Subjects and activities are the things and processes that are described. The others are description entities related to other objects and themselves through relationships.



Relationships provide an association mechanism between objects. Relationships are divided into association, collection, specialization, composition, involvement (acting upon), property assignment, sequencing and measure assignment.



Collections provide for all kinds of groupings of objects, including nested collections, by means of the collect relationship.

Properties are entities that provide the context for data stored as values. Properties are differentiated according to types of data containment: enumeration values, list values, bounded list values, bounded values, single values and table values.

The value content, associated with a property through a measure with a unit, will be stored in the value component, which is language-dependent. The latter entity models the way any name, description, value or reference is represented on a per language base.

The model described in this part of ISO 12006 is proposed as a bridge between classification systems as described in ISO 12006-2 [5], and product modelling as described in several publications [2], [3], [6], [7].

# Building construction — Organization of information about construction works —

## Part 3: Framework for object-oriented information

## 1 Scope

This part of ISO 12006 specifies a language-independent information model which can be used for the development of dictionaries used to store or provide information about construction works.

It enables classification systems, information models, object models and process models to be referenced from within a common framework.



## 2 Normative 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 10303-11, *Industrial automation systems and integration — Product data representation and exchange — Part 11: Description methods: The EXPRESS language reference manual*

ISO/IEC 10646, *Information technology — Universal Multiple-Octet Coded Character Set (UCS)*

## 3 Language encoding

All information that is specified as type “String”, or that resolves to type “String”, shall be able to be expressed using the UNICODE character set [8] as set out in ISO/IEC 10646, preferably using the UTF-8 encoding form, the UTF-8 encoding scheme and the “UCS Transformation Format 8” [4].

## 4 Specification

### 4.1 General

The model in this part of ISO 12006 is specified using the EXPRESS data definition language according to ISO 10303-11.

The model is described informally in 4.2, conforming to the EXPRESS-G notation.

The model is described formally in the EXPRESS language specification presented in 4.3 and as an EXPRESS long form specification in 4.4.

## 4.2 EXPRESS-G specification

The informal EXPRESS-G specification that uses the EXPRESS-G notation is given in six diagrams (Figures 1 through 6), where each diagram specifies a part of the model. All entities in these diagrams are specified formally in 4.3.

— Figure 1 shows the top level diagram with xtdRoot, its attributes and its derived types xtdObject, xtdRelationship and xtdCollection.

— Figure 2 shows xtdLanguageRepresentation with its derived types xtdName and xtdDescription that are attributed to xtdRoot and its subtypes.

— Figure 3 shows the relationship types derived from xtdRelationship that are used to establish possible relationships between xtdObjects, xtdCollections and xtdExternalDocuments or subtypes of these.

— Figure 4 shows the assignment of xtdProperties to xtdObjects through xtdRelAssignsProperties and xtdMeasureWithUnit with the assignment of values, through xtdRelAssignsMeasures.

— Figure 5 lists the basic types used in the model and their related EXPRESS types.

— Figure 6 shows details of xtdValue and xtdExternalDocument.

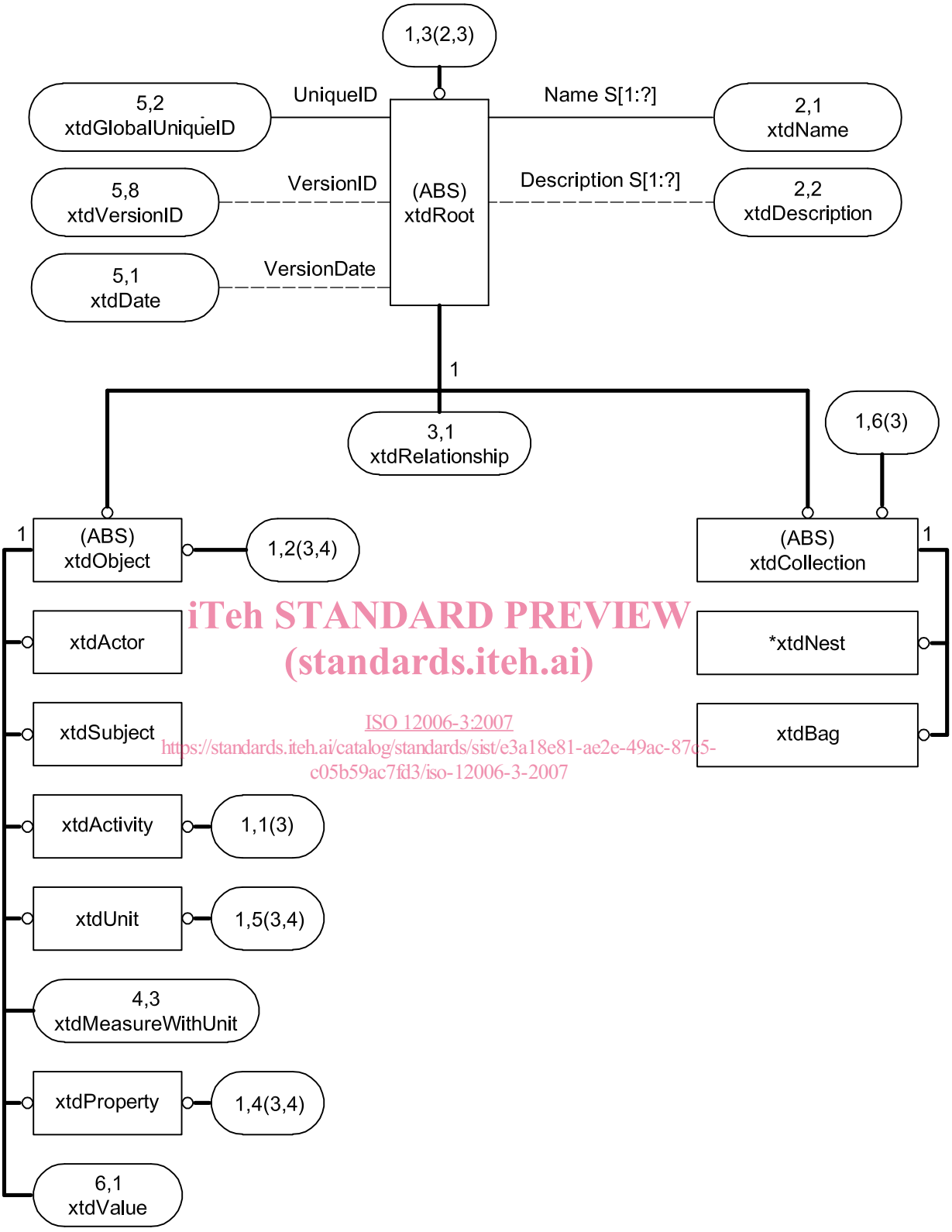




**Figure 1 — EXPRESS-G diagram 1 — Top level with root concept**

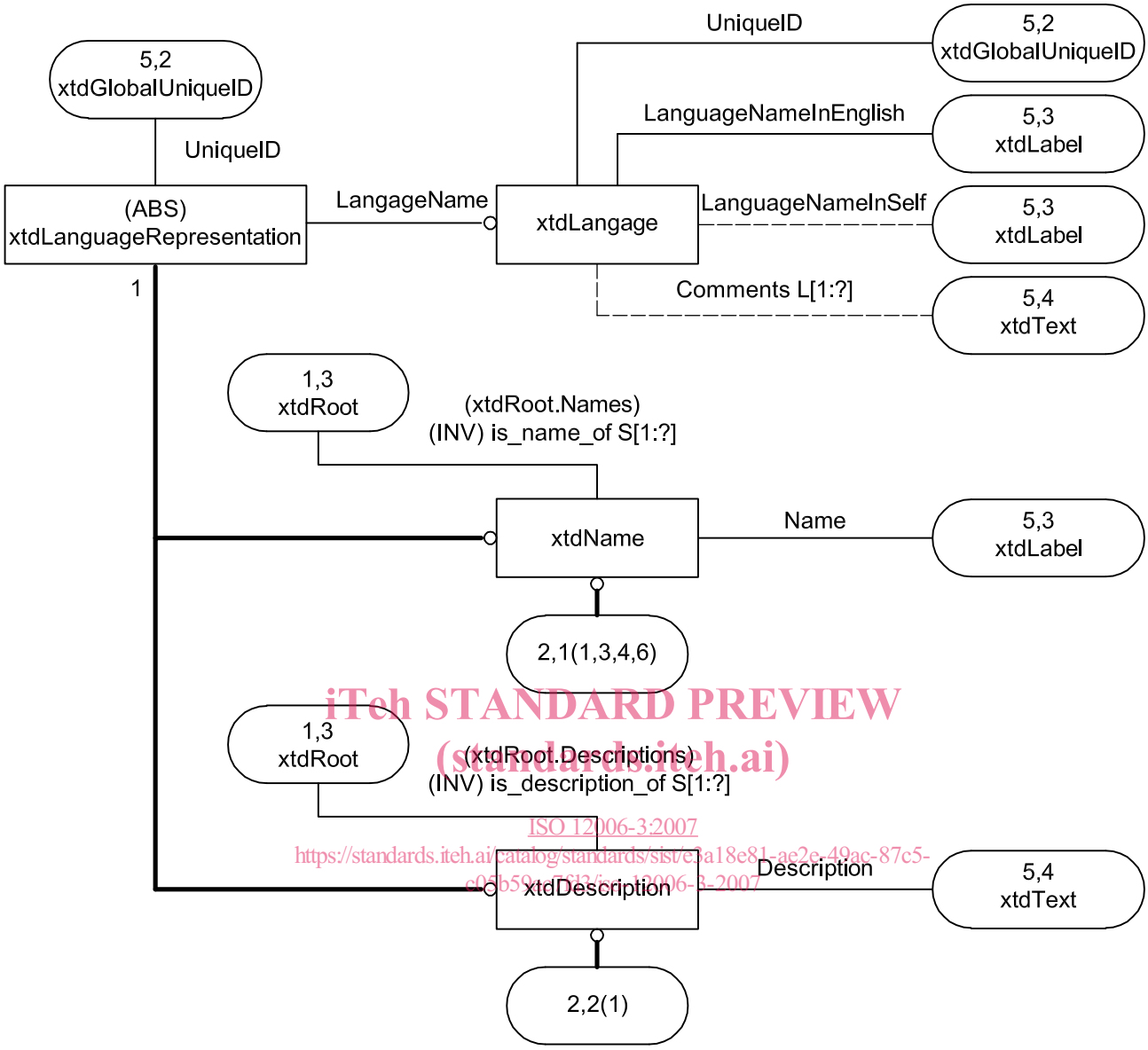




**Figure 2 — EXPRESS-G diagram 2 — Language representation, names and descriptions**

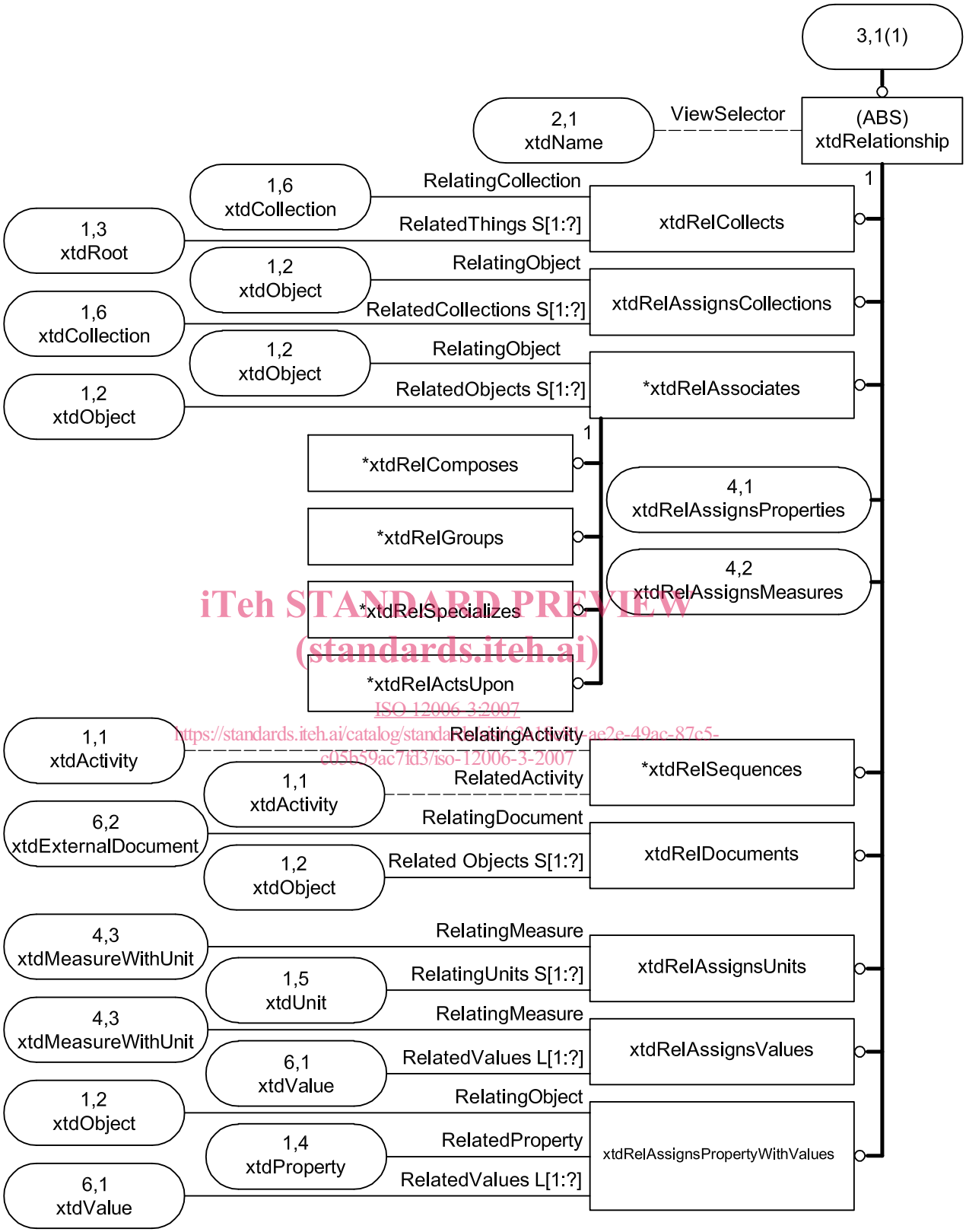




**Figure 3 — EXPRESS-G diagram 3 — Relationships**

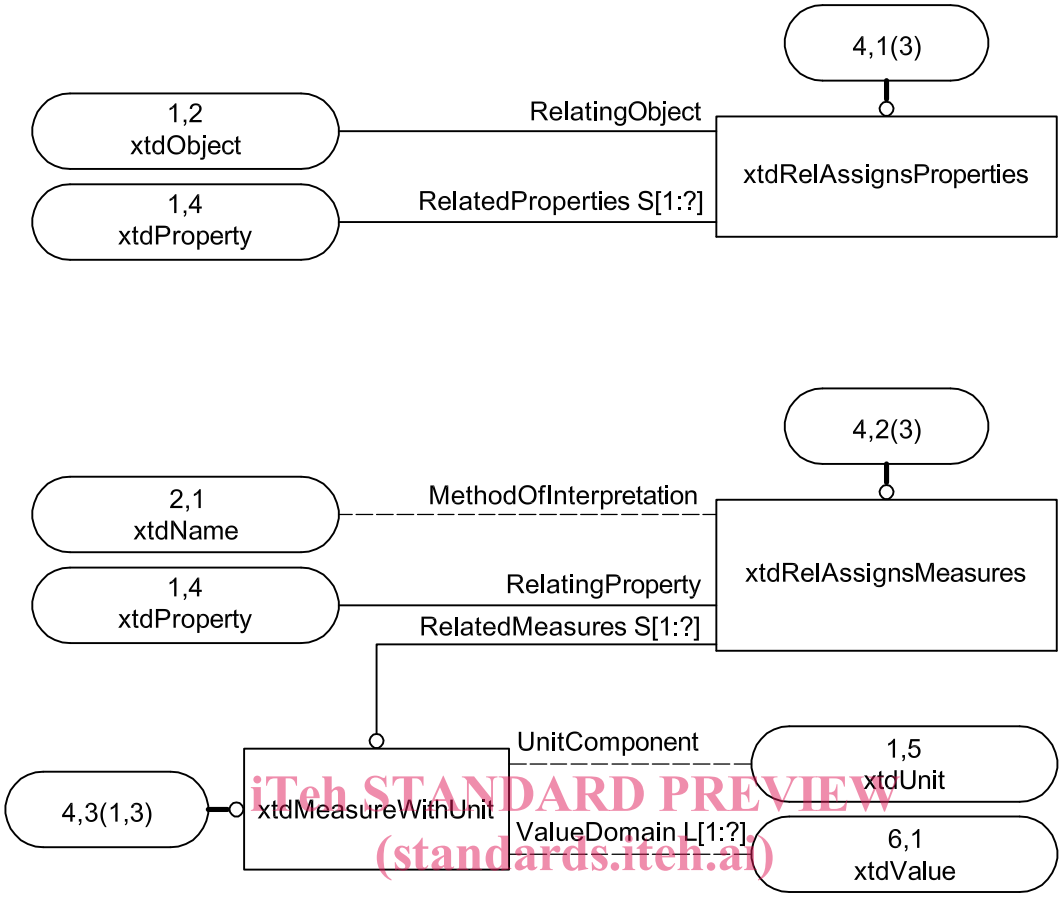




**Figure 4 — EXPRESS-G diagram 4 — Assignment of properties and measures**

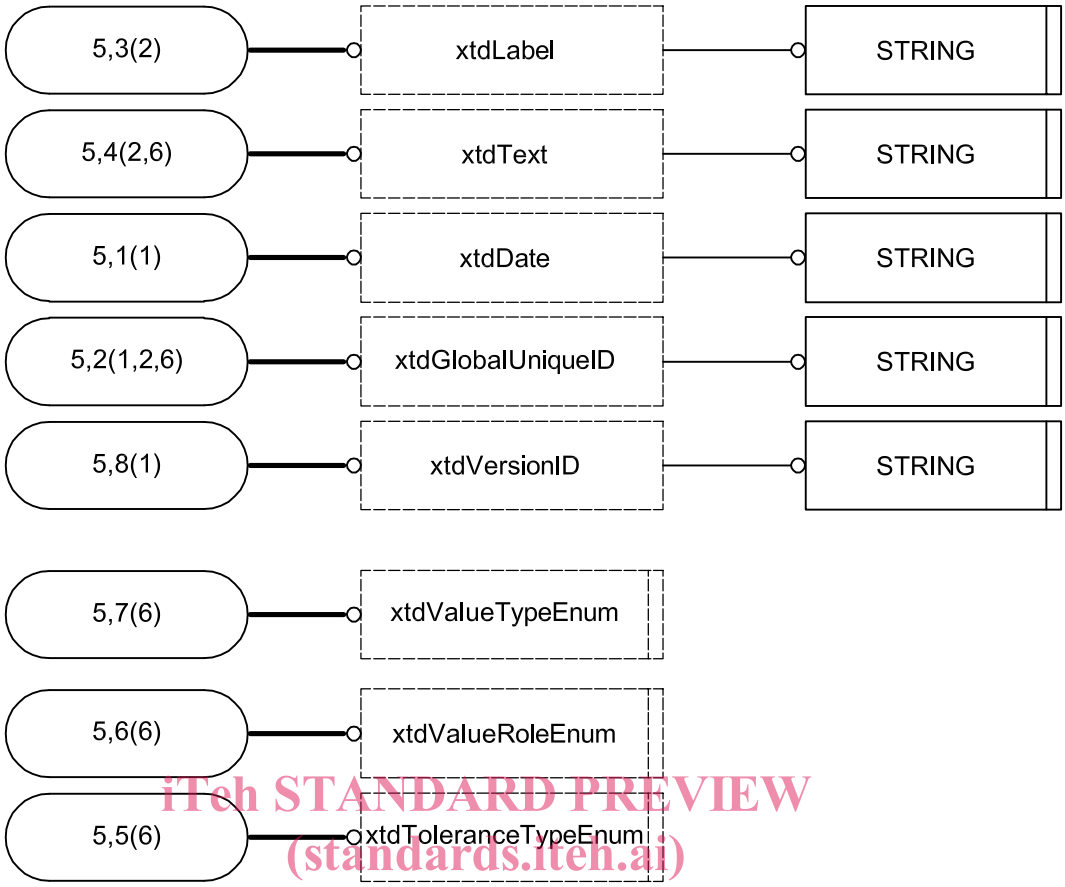




**Figure 5 — EXPRESS-G diagram 5 — Basic types**