OmniClass®

A Strategy for Classifying the Built Environment

Introduction and User's Guide

Introduction Edition: 2.1, 2019-02-22 Release

CSI
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Executive Summary

OmniClass® is a comprehensive classification system for the construction industry. *OmniClass* can be used for many applications, such as filing physical materials or organizing project information, but its chief application is to provide a classification structure for electronic databases and software, enriching the information used in those resources. *OmniClass* incorporates other extant systems currently in use as the basis of two of its Tables – *MasterFormat*® for Table 22 - Work Results and *UniFormat*® for Table 21 - Elements.

OmniClass provides a method for classifying the full built environment through the full project life cycle.

OmniClass has been maintained and developed with a North American focus but can be used to classify construction and its components in other countries. *OmniClass* intentionally includes content from all types of construction - commercial and institutional buildings, horizontal construction like roads and railways, process plants and industrial construction, heavy civil projects like dams and bridges, and even single-family residential construction. This breadth and depth of coverage allows for organizing, filtering, sorting, and retrieving information, and standardizing digital data exchanges.

In addition to its use to prepare and tag project information, *OmniClass* may also be used to communicate exchange information such as that required by the Construction-Operations Building Information Exchange (COBie), and other information generated during a project life cycle.

OmniClass was developed and is maintained following the framework set out in International Organization for Standardization (ISO) standard last updated in 2015, ISO 12006-2:2015 *Building construction -- Organization of information about construction works -- Part 2: Framework for classification*.

OmniClass was first developed using the following guiding principles by the OCCS Development Committee at their September 29, 2000 inaugural meeting:

- *OmniClass* is an open and extensible standard available to the AEC industry at large.
- There is a full and open exchange of information between participants in *OmniClass* development.
- *OmniClass* is being developed and updated with broad industry participation.
- *OmniClass* development is open to any individual or organization willing to actively participate.
- The industry as a whole, rather than any one organization, will govern development and dissemination of *OmniClass*.
- *OmniClass* is focused on North American terminology and practice.
- *OmniClass* is compatible with appropriate international classification system standards.
- Applicable efforts in other parts of the world are reviewed and adapted as appropriate.
- Existing legacy classification systems, references, and research materials applicable to *OmniClass* development are considered in the formulation of the *OmniClass*.

The intent of these principles have since guided *OmniClass* development. For example, while *OmniClass* today may not be characterized as strictly open or extensible or governed by the industry as a whole, *OmniClass* is developed by individual and group input and expertise.

OmniClass consists of 15 tables, each of which represents a different facet of construction information. Each table can be used independently to classify one type of information, or entries on it can be combined with entries on other tables to further refine the classification, add more access points to the information, or to classify more complex subjects.

The 15 inter-related *OmniClass* tables are:
- Table 11 - Construction Entities by Function
- Table 12 - Construction Entities by Form

- Table 13 - Spaces by Function
- Table 14 - Spaces by Form

- Table 21 - Elements
- Table 22 - Work Results
- Table 23 - Products

- Table 31 - Phases
- Table 32 - Services
- Table 33 - Disciplines
- Table 34 - Organizational Roles
- Table 35 - Tools
- Table 36 - Information

- Table 41 - Materials
- Table 49 - Properties

Introduction

Classification provides a means to add structure to the often-unstructured data and information generated during the project life cycle. This structure allows users to narrow searches, to present information in a way that makes sense to the receiver, and to retrieve asset object groupings without specific knowledge of the objects composing that grouping.

OmniClass discourages use of local deviations from the standard in implementations. *OmniClass* can only serve as an effective tool for communications and providing structure to data that persists through time and between uses if standard classifications are used.

The scope of *OmniClass* is designed to encompass a broad array of object sizes and scales, from completed structures and multi-structure complexes to individual products and component materials. *OmniClass*'s breadth covers all forms of construction, vertical and horizontal, industrial, commercial and residential. *OmniClass* also addresses actions, people, tools, and information that play a role in, or are used or developed during the project lifecycle.

Users may use *OmniClass* throughout a facility's life cycle, from conception, design, and creation to its eventual demolition, deconstruction, recycling, or re-purposing.

OmniClass is developed continuously and all interested parties may participate. This continuous development allows *OmniClass* content to address previously unmet needs as they arise.

ISO Background

The concept for *OmniClass* is derived from internationally-accepted standards that have been developed by the International Organization for Standardization (ISO).

ISO Technical Committee 59, Subcommittee 13, Working Group 2 (TC59/SC13/WG2) has drafted a revised standard for a classification framework, ISO 12006-2:2015 *Building construction -- Organization of information about construction works -- Part 2: Framework for classification* (ISO 12006-2:2015, initially published in 2001) that gives a standardized structure for construction classification. The Committee also recognized the need to define an "object oriented" approach that would work in concert with classification. That standard, ISO 12006-3:2007 *Organization of information about construction works -- Part 3: Framework for object-oriented Information* (ISO 12006-3:2007), provides a strategy for identifying, relating, and managing of objects and their properties. *OmniClass* follows the recommendations in ISO 12006-2:2015.

With the development of ISO 12006-2:2015, more countries have pursued their own approaches to classification following that standard. The most developed of these apart from *OmniClass* is *Uniclass*, developed by the Construction Industry Project Information Committee (CPIC) of the UK. CPIC first published a usable version of *Uniclass* in 1997. The current version of *Uniclass* is *Uniclass 2015*, now managed by NBS in the UK.

In addition to the application of ISO 12006-2:2015 in *Uniclass* and *OmniClass*, the object-oriented framework standardized by ISO 12006-3:2007 has been adopted by buildingSMART International as the basis for the buildingSMART Data Dictionary.

As stated in the introduction of ISO 12006-2:2015, "[W]hile national classifications that implement this part are still likely to differ in their detail (for example, due to differences in construction culture and legislation), mapping between them should be fairly straightforward. This is because they will be using the same overarching classification framework and construction object class definitions. This, in turn, will help with international construction project work (with participants from many countries), and with development of applications intended to be used internationally."

ISO 12006-2:2015 *Building construction -- Organization of information about construction works -- Part 2: Framework for classification* provides a basic structure of information addressed in construction classification that is grouped into three primary categories composing the process model: *construction result, construction process,* and *construction resource*. These are then divided into twelve suggested "Tables" for organizing construction information. The *OmniClass* tables correspond to this primary arrangement of information in the following ways:
- Tables 11-22 classify construction results
- Tables 23, 33, 34, 35, 36, and 41 classify construction resources
- Tables 31 and 32 classify construction processes

ISO 12006-2:2015 provides another classification group "classes related to property" that *OmniClass* Table 49 classifies. Properties are viewed as an adjunct set of criteria that can be applied to objects and also be used to further specialize classification beyond what may be presented in the classification schema. From ISO 12006-2:2015 Section 4.6: "[M]embers of classes have properties. These properties can be used to define and subdivide the classes to finer levels of detail." *OmniClass* follows this recommendation in implementation - properties and their values can be used to increase specialization beyond the terminal node of any classification table.

The fifteen tables of *OmniClass* also map to the suggested tables in Section 5 and Annex A of ISO 12006-2:2015 in the following way (ISO identifications are given for location in Annex A):

OmniClass Table	Related ISO 12006-2:2015 Table
OmniClass Table 11 - Construction Entities by Function *OmniClass* Table 12 - Construction Entities by Form	ISO A.8 Construction complexes (by form or function or user activity or any combination of these) ISO A.9 Construction entities (by form or function or user activity or any combination of these) *(OmniClass Tables 11 and 12 classify the information presented by ISO A.8 and A.9, but from a different set of complementary facets)*
OmniClass Table 13 - Spaces by Function *OmniClass* Table 14 - Spaces by Form	ISO A.10 Built spaces (by form or function or user activity or any combination of these) *(OmniClass Tables 13 and 14 present two complementary ways of classifying the information described by ISO A.10)*
OmniClass Table 21 - Elements	ISO A.11 Construction elements (by function or form or position or any combination of these)

OmniClass Table 22 - *Work Results*	ISO A.12 Work results (by work activity and resources used)
OmniClass Table 23 - *Products*	ISO A.3 Construction products (by function or form or material or any combination of these)
OmniClass Table 31 - Phases	ISO A.7 Construction process (by construction activity or construction process lifecycle stage or any combination of these)
OmniClass Table 32 - Services	ISO A.6 Management (by management activity)
OmniClass Table 33 - Disciplines OmniClass Table 34 - Organizational Roles	ISO A.4 Construction agents (by discipline or role or any combination of these) *(OmniClass Table 33 and Table 34 separate the proposed methods of classification given by ISO A.4 into two complementary tables)*
OmniClass Table 35 - Tools	ISO A.5 Construction aids (by function or form or material or any combination of these)
OmniClass Table 36 - Information	ISO A.2 Construction information (by content)
OmniClass Table 41 - Materials OmniClass Table 49 - Properties	ISO A.13 Construction properties (by property type)

ISO 12006-3:2007: *Organization of information about construction works -- Part 3: Framework for object-oriented Information* complements the organizational outcome of ISO 12006-2:2015 but uses the information such as entries on classification tables as the defining points for or characteristics of object-oriented information. The "object-oriented" approach describes the characteristics of things without imparting a grouping preference or hierarchical order.

In the object-oriented approach, the object is central, acting as a basis for characteristics or properties that describe it. An object thus described can then be grouped with similar objects and given a context in a classification hierarchy using *OmniClass*. The framework established by ISO 12006-3:2007 will enable computers to store and relate information in an object-oriented manner, while *OmniClass* tables provide humans with a variety of viewpoints to that data and a useful approach to filter and present that information.

Reference Sources

OmniClass is developed using a guiding principle from the September 2000 meeting: "[U]tilize existing systems and compatible initiatives to avoid duplication of effort." This means that users rely on and are familiar with existing classification systems, that those systems meet those users' needs, and that those systems are valuable because they have been developed and refined by talented individuals over many years.

When we use or adapt reference sources and apply them to *OmniClass*, we avoid reinventing the wheel and introducing users to a new wheel. This allows *OmniClass* Development Committee members to address areas for which classification tables have not yet been developed or to harmonize existing approaches into a single *OmniClass* table. The *OmniClass* Development Committee considered the following, among others, when developing *OmniClass*:

- *MasterFormat*
- *UniFormat*
- Selected resources provided by the U.S. General Services Administration (GSA), the U.S. Department of Defense, the U.S. Army Corps of Engineers, the U.S. Department of Veterans Affairs, the Open

Standards Consortium for Real Estate (OSCRE), the International Facility Management Association (IFMA), Building Owners and Managers Association International (BOMA), the International Code Council (ICC), and others

Most of the above, apart from *MasterFormat* and *UniFormat*, were incorporated into *OmniClass* after significant modification. Although *OmniClass* uses both as reference sources, *MasterFormat* and *UniFormat* will continue to exist as single-viewpoint applications and implementations that parallel their tables in *OmniClass*. Acting as applications of *OmniClass* will enable these systems to function for their original purposes, rather than having their content reorganized to fit narrower *OmniClass* table definitions.

MasterFormat®

MasterFormat is the pre-eminent means for organizing commercial and institutional construction specifications in North America. Initially published in 1963 by CSI and updated since 1978 with the participation of Construction Specifications Canada (CSC), *MasterFormat* is used by individuals and companies in the construction industry for organizing specifications, cost estimates, product data, and other construction information. Because of its widespread use, development and refinement, *MasterFormat* is the obvious reference source for the contents of *OmniClass* Table 22 - Work Results.

Please note: Some non-Work Result content of *MasterFormat* is not included in *OmniClass* Table 22.

UniFormat®

UniFormat provides a standard method for arranging construction information, organized around physical parts of a facility often called systems and assemblies. These systems and assemblies are characterized by their function without identifying the technical solutions that may compose them. The 2010 edition of *UniFormat* is the reference source for Table 21 - Elements.

Please note: Some non-Elemental content of *UniFormat* is not included in *OmniClass* Table 21.

Correspondence with Other Standards and Resources

The standards and resources in the following headings describe projects or resources where *OmniClass* is currently being implemented or used. The list is not exclusive and is intended to highlight projects that use *OmniClass* as intended, adding to the quality of information made available to users.

National BIM Standard-United States® (NBIMS-US)

All *OmniClass* tables have been balloted through the National Institute of Building Sciences consensus process for National BIM Standard-United States (NBIMS-US). The tables have been included as reference standards in versions 2.0 and updated in newer versions of NBIMS-US.

Construction-Operations Building Information Exchange (COBie)

Also part of NBIMS-US, the Construction-Operations Building Information Exchange (COBie) is an information exchange specification for the life-cycle capture and delivery of information needed by facility managers. COBie incorporates several *OmniClass* tables as default classification resources for the object types it describes. Among the *OmniClass* tables used by COBie are Table 13 - Spaces by Function, Table 21 - Elements, and Table 23 - Products.

Level of Development (LOD) Specification

First published in 2013 by BIMForum, the US Chapter of buildingSMART International, the Level of Development (LOD) Specification has since gone through annual updates and expansions. The current LOD Specification is the 2018 edition.

The LOD Specification is a reference that enables practitioners to specify and articulate clearly the content and reliability of Building Information Models (BIMs) at various stages in the design and construction process. The LOD Specification utilizes the basic LOD definitions developed by the AIA for the AIA G202-2013 Building Information Modeling Protocol Form and is organized by CSI *UniFormat* 2010 and *OmniClass* Table 21 - Elements.

APPA TCO 1000 Total Cost of Ownership Standard

APPA 1000-1 Total Cost of Ownership for Facilities Asset Management (TCO) – Part 1: Key Principles is a total cost of ownership (TCO) ANSI standard published by APPA in 2017. *OmniClass* table references and guidance on classification including recommendation of *OmniClass* are included in the standard. CSI is currently working with APPA on Part 2 of the standard that will assist users in implementing asset management and campus planning that incorporates TCO.

CSI Project Dynamo

CSI announced CSI Project Dynamo in April 2018. Driven by rapid change, the need to better integrate specifications, building products, and building information modeling (BIM), CSI Project Dynamo is an initiative to expand CSI's industry-standard classifications to work more effectively and seamlessly with software, supporting the digital needs of design and construction professionals.

CSI Project Dynamo is a pilot program to expand the *MasterFormat*, *UniFormat*, and *OmniClass* standards for organizing construction information by creating a more robust connection between the standards and BIM objects. These standards are used by tens of thousands of AECO professionals globally and are embedded in a wide range of design and project software.

Uniclass 2015

Both *Uniclass* and *OmniClass* draw their table definitions and table concepts from ISO 12006-2:2015. This common source of table definitions provides a basis for *Uniclass* and *OmniClass* content to be correlated. The following chart shows how some *OmniClass* tables relate to *Uniclass* tables.

OmniClass Table 11 - Construction Entities by Function *OmniClass* Table 12 - Construction Entities by Form	*Uniclass 2015* Table Co - Complexes *Uniclass* 2015 Table En - Entities
OmniClass Table 13 - Spaces by Function *OmniClass* Table 14 - Spaces by Form	*Uniclass 2015* Table SL - Spaces/locations
OmniClass Table 21 - Elements	*Uniclass 2015* Table EF - Elements/functions *Uniclass 2015* Table Ss - Systems
OmniClass Table 22 - Work Results	(NBS took a decision not to have a work results table in *Uniclass 2015*. An examination of the contents of *Uniclass 2015* - Table Ss reveals many titles which are like those in *OmniClass* Table 22, often with the word "systems" appended to the end.)
OmniClass Table 23 - Products	*Uniclass 2015* Table Pr - Products
OmniClass Table 31 - Phases	*Uniclass 2015* Table Ac - Activities (*in part*)
OmniClass Table 32 - Services	*Uniclass 2015* Table Ac - Activities (*in part*)
OmniClass Table 33 - Disciplines *OmniClass* Table 34 - Organizational Roles	*Uniclass 2015* Table PM - Project management (*in part*)
OmniClass Table 35 - Tools	*Uniclass 2015* Table TE - Tools and Equipment
OmniClass Table 36 - Information	*Uniclass 2015* Table FI -Form of information (BETA) *Uniclass* 2015 PM - Project management (*in part*)
OmniClass Table 41 - Materials *OmniClass* Table 49 - Properties	No classification of properties or materials in *Uniclass 2015*

OmniClass Table Structure and Implementation

Classification Table Concept – Overview

OmniClass segregates views of objects into a set of discrete, coordinated tables. The information contained in each *OmniClass* table exists, and is organized, based on a specific facet or view of the total information that exists in the built environment. This allows for a variety of viewpoints by which objects in a facility or project can easily be filtered or presented.

Users may use entries from *OmniClass* tables as a value for a classification property used in model objects such as Industry Foundation Classes (IFC). This enables users to classify and present information consistently from a number of facets or viewpoints.

The individual tables in *OmniClass* are all hierarchies: broad-based concepts are at the top and the most detailed concepts are at the bottom. The concepts at any level may be changed when new or innovative products or technologies are introduced or when existing subjects expand and grow. Headings at any level can be expanded without disrupting existing classifications.

Level of Granularity

Level of granularity refers to the degree of specialization of the terminal node (most narrow classification) of any classification hierarchy. Establishing the correct level of granularity for any classification is a balancing act. A classification must have sufficient detail to differentiate it from other classifications at the same level of the hierarchy and the specialization that provides that differentiation must be meaningful to users, aligning with how users think of the objects in the classification. However, extending a classification with too much granularity frustrates users who will not use it; making the granularity too fine makes the classification difficult to maintain.

Making classifications easy to use means limiting breadth and depth expansions as much as possible. A good rule to test whether granularity is useful is to determine when a classification is no longer identifying a class of similar objects and begins to identify instances of those objects. Typically, that point is reached between the third and fifth level of classification, but some *OmniClass* tables extend classes to level six or seven because of the upper level arrangement or the type or amount of content addressed by those tables. The number and granularity of *OmniClass* top level classes are designed to reduce user frustration while giving users a manageable number of classifications.

Although *OmniClass* can be used to classify physical objects and order their associated storage methods, *OmniClass*'s primary intended use is to classify and order digital objects. Using a database or software that filters by *OmniClass* table classifications is a better and more flexible way to manage objects and information than a simple flat-file storage system. In addition, users can take *OmniClass* classifications from more than one table to provide more granular, but still usable classification. Applying two or more classifications to a single digital object works if permitted by the software. For those wishing to classify the shelf or storage location of physical objects, applying two or more classifications is ideal. A section below provides guidance to combine classifications from more than one *OmniClass* table for classifying physical objects.

Users that do not require the full detail of an *OmniClass* table entry or that wish to classify a subject that is not identified specifically in an *OmniClass* table may classify at a higher (conceptually broader) level in the *OmniClass* hierarchy.

Decomposition vs. Specialization

There are two complementary ways of subdividing classes of objects, known as decomposition and specialization. Example hierarchies are given in the illustration below. Essentially, decomposition breaks down an

object into component objects that make it up, sort of a pieces and parts approach, where specialization identifies more narrow classes based on one or more methods by which the whole objects can be differentiated from each other. Though both approaches have merit for information management, *OmniClass* tables employ specialization exclusively in structuring their hierarchies.
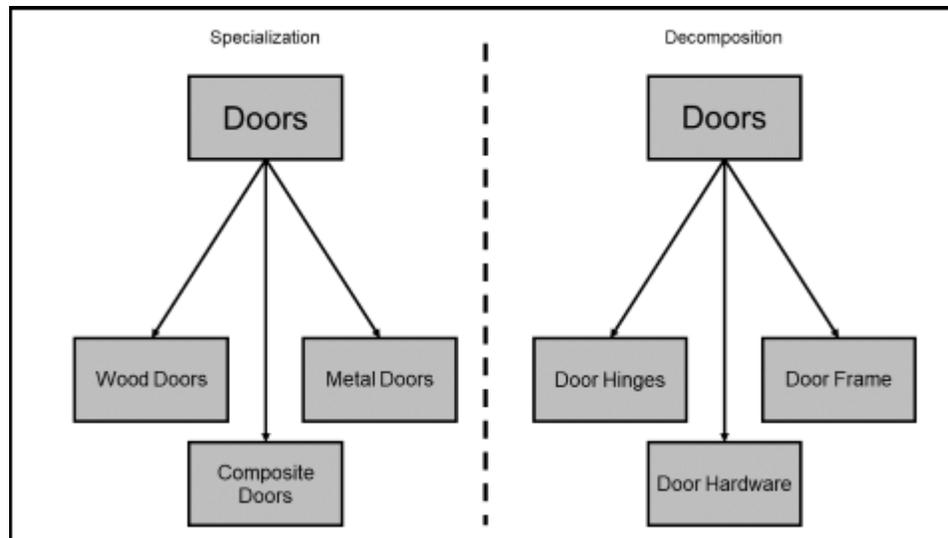
An illustration of specialization and decomposition.

Table Descriptions

Below is a list of the *OmniClass* tables, with table definitions and examples of their contents.

Table 11 - Construction Entities by Function	**Definition**: **Construction Entities by Function** are significant, definable units of the built environment comprised of interrelated spaces and elements and characterized by function.
	Examples: Single Family Residence, Mining Facility, Local Transit Bus Station, Interstate Highway, Waste Water Treatment Facility, Freezer Storage Facility, Department Store, Courthouse, Hotel, Convention Center
Table 12 - Construction Entities by Form	**Definition: Construction Entities by Form** are significant, definable units of the built environment comprised of interrelated spaces and elements and characterized by form.
	Examples: High-Rise Building, Suspension Bridge, Platform, Liquid Storage Tank
Table 13 - Spaces by Function	**Definition: Spaces by Function** are basic units of the built environment delineated by physical or abstract boundaries and characterized by their function or primary use.
	Examples: Kitchen, Elevator Shaft, Office Space, Sidewalk
Table 14 - Spaces by Form	**Definition: Spaces by Form** are basic units of the built environment delineated by physical or abstract boundaries and characterized by physical form.

	Examples: Room, Alcove, Cavity, Courtyard, Easement, City Block
Table 21 - Elements	**Definition:** An **Element** is a major component, assembly, or *"constituent of a construction entity with a characteristic function, form, or position"* (ISO 12006-2:2015). Predominating functions include, but are not limited to, supporting, enclosing, servicing, and equipping a facility. Functional descriptions can also include a process or an activity.
	Examples: Structural Floors, Exterior Walls, Storm Sewer Utility, Stairs, Roof Framing, Furniture and Fittings, HVAC Distribution
Table 22 - Work Results	**Definition: Work Results** are construction results achieved in the production stage or by subsequent alteration, maintenance, or demolition processes, and identified by one or more of the following: the particular skill or trade involved; the construction resources used; the part of the construction entity which results; the temporary work or other preparatory or completion work which results. ISO 12006-2: 2015 defines work result as *view of construction result by type of work activity and resources used* and defines construction result as *a construction object which is formed or changed in state as the result of one or more construction processes using one or more construction resources.*
	Examples: Cast-in-Place Concrete, Structural Steel Framing, Finish Carpentry, Built-Up Bituminous Waterproofing, Glazed Aluminum Curtain Walls, Ceramic Tiling, Hydraulic Freight Elevators, Water-Tube Boilers, Interior Lighting, Railways
Table 23 - Products	**Definition: Products** are components or assemblies of components for permanent incorporation into construction entities.
	Examples: Concrete, Common Brick, Door, Metal Window, Junction Boxes, Pipe Culverts, Cast-Iron Boiler, Curtain Walls, Textured Paints, Vinyl-Coated Fabric Wall Covering, Demountable Partitions, Pre-Engineered Manufactured Structures
Table 31 - Phases	**Definition: Phases** are periods of time in the duration of a construction project identified by the overall character of the construction processes which occur within it.
	Examples: Inception Phase, Conceptualization Phase, Criteria Definition Phase, Design Phase, Coordination Phase, Implementation Phase, Handover Phase, Operations Phase, Closure Phase
Table 32 - Services	**Definition: Services** are the activities, processes and procedures provided by participants in the design and construction process, and relating to the construction, design, maintenance, renovation, demolition, commissioning, decommissioning, and all other functions occurring in relation to the life cycle of a construction entity.

	Examples: Programming, Bidding, Estimating, Constructing, Surveying, Maintaining, Inspecting
Table 33 - Disciplines	**Definition: Disciplines** are the practice areas and specialties of the participants who are performing services during the life cycle of a construction entity, considered in light of education and training required to perform in those disciplines.
	Disciplines are presented without regard to the job functions that may be performed by individuals or teams, which are classified by Table 34 - Organizational Roles. Disciplines from Table 33 can be combined with entries from Table 34 - Organizational Roles to provide a more complete classification of a construction participant's role, such as an Electrical Contracting (discipline) Supervisor (organizational role).
	Examples: Architecture, Interior Design, Mechanical Engineering, General Contracting, Legal Services, Finance, Real Estate Sales
Table 34 - Organizational Roles	**Definition: Organizational Roles** are the technical positions occupied by the participants, both individuals and groups, that carry out the processes and procedures which occur during the life cycle of a construction entity.
	Examples: Executive, Supervisor, Owner, Architect, Cost Estimator, Specifier, Contractor, Administrative Assistant, Operator, Apprentice, Team, Committee, Association
Table 35 - Tools	**Definition: Tools** are the resources used to develop the design and construction of a project that do not become a permanent part of the facility, including computer systems, vehicles, scaffolding and all other items needed to execute the processes and procedures relating to the life cycle of a construction entity.
	Examples: Computer Hardware, CAD Software, Temporary Fencing, Backhoe, Tower Crane, Site Drainage Equipment, Formwork, Hammer, Light Truck, Site Hut
Table 36 - Information	**Definition: Information** is data referenced and utilized during the process of creating and sustaining the built environment.
	Examples: Guides, Periodicals, Design Drawings, Specifications, Codes, Leases, Deeds, Catalogs, Operations and Maintenance Manuals, Record Documents, Reports
Table 41 - Materials	**Definition: Materials** are basic substances used in construction or to manufacture products and other items used in construction. These substances may be raw materials or refined compounds, and are presented entirely without reference to their form.
	Examples: Metals, Igneous Rocks, Coal Tar Pitch, Timber, Glass, Plastics, Butyl Rubber
Table 49 - Properties	**Definition: Properties** are characteristics of construction objects. Properties gain values through application to instances of construction objects.

	Examples: Color, Width, Length, Thickness, Depth, Inside Diameter, Net Rentable Area, Fire Resistance Rating, Weight, Compressive Strength, Freeze-Thaw Resistance.

OmniClass Application Guide

Table Review and Status

OmniClass table reviews take place on a regular basis to help ensure that tables meet user needs. A review may also be triggered by a user who requests additional content and is willing to assist with generation of that content.

OmniClass tables are published at varying levels of content maturity depending on reviewers' efforts, outside group participation, and when changes are approved by the *OmniClass* Development Committee.

The current publication statuses are:

1. **National Standard** - A table approved by the *OmniClass* Development Committee and reviewed and approved by a formal consensus process, such as the National BIM Standard consensus process. A table with this status is presented for use as a United States national consensus standard.

2. **Pre-Consensus Approved Draft** - A table approved by the *OmniClass* Development Committee but not yet reviewed or approved a formal consensus process.

3. **Draft for Comment** - A table on which the *OmniClass* Development Committee seeks to gather commentary for future development but that is not ready to be submitted to a formal consensus process.

The table statuses of each table as of **June 1, 2018** are as follows:

Table 11 - Construction Entities by Function	National Standard, 2013-02-26
Table 12 - Construction Entities by Form	National Standard, 2012-10-30
Table 13 - Spaces by Function	National Standard, 2012-05-16
Table 14 - Spaces by Form	Draft for Comment, 2006-03-28
Table 21 - Elements	National Standard, 2012-05-16
Table 22 - Work Results	National Standard, 2013-08-25
Table 23 - Products	National Standard, 2012-05-16
Table 31 - Phases	National Standard, 2012-10-30
Table 32 - Services	National Standard, 2012-05-16
Table 33 - Disciplines	National Standard, 2012-10-30
Table 34 - Organizational Roles	National Standard, 2012-10-30
Table 35 - Tools	Draft for Comment, 2006-03-28
Table 36 - Information	National Standard, 2012-05-16
Table 41 - Materials	National Standard, 2012-10-30
Table 49 - Properties	National Standard, 2012-10-30

Numbering Conventions

OmniClass has human-interpretable numbers assigned to all entries in *OmniClass* tables.

Numbering *OmniClass* tables provides a means of mapping and describing locations in the tables with more certainty from edition to edition. The numbers also serve to illustrate hierarchies and levels of granularity for any given class. Understanding how *OmniClass* numbers are structured provides a mental map to a classification's location, clarifying the hierarchical level and table of any entry.

In addition to these human-interpretable numbers, *OmniClass* also assigns Global Unique Identifiers (GUIDs) to all classifications. *OmniClass* GUIDs do not change between editions and provide a solid foundation for software to reference classifications and to map between *OmniClass* editions where *OmniClass* numbers may have changed. Further discussion of *OmniClass* GUIDs is below.

Alphanumeric (combining letters with numbers) identifiers were rejected for a variety of reasons early in *OmniClass* development:

- The widespread use of letters in other classifications, where the same letters often have designations that are not in agreement.
- Interest from countries in Asia may be frustrated by identification based in part on the ASCII Latin1 alphabet.
- There can be visual identification problems with the use of some ASCII letters in combination with numbers. Uppercase "O", uppercase "I", and lowercase "l" are easily confused with the numbers 0 and 1.

As a result, a purely numeric approach has been selected when assigning numbers to classes in the *OmniClass* tables.

OmniClass numbering rules are as follows:

- The first pair of digits designates the table number (i.e. 11, 12, 13… 36, 41, 49). The table number digits are offset from the rest of the *OmniClass* number by a dash ("-").
- Additional pairs of digits designate each level of classification. Leading zeros are used for the first nine entries in each level, 01-09.
- Double zero (00) is a special number used in many tables to fill out a numerical string for a higher level (conceptually broader) entry to six digits (such as 05 00 00). A double zero indicates no content at the level of that pair of digits in the *OmniClass* number.
- **Though patterns may be observed in some tables' numbering, these patterns have no importance.**
- Increasing specialization in levels of classification will read from left to right (the first pair of numbers will correspond to level one, or top level, of classification, the next pair represent level two, the third pair of digits represent level three, etc.)
- As additional classification granularity is needed, additional pairs of numbers are added to the base three levels.

OmniClass GUID

Global Unique Identifiers (GUID, also known by the term Universally Unique Identifiers or UUID) that follow the ISO standard ISO/IEC 11578:1996 *Information technology - Open Systems Interconnection - Remote Procedure Call (RPC)* are assigned to all *OmniClass* classifications in tables upon publication. These GUIDs make possible database and software implementations that reference single classes despite changes over time and between editions for the human-readable *OmniClass* numbers and titles.

Elements of an OmniClass Classification Object

As described above, each *OmniClass* classification object consists of a number of discrete values. They are:

- *OmniClass* number
- *OmniClass* title
- Description
- *OmniClass* GUID

The first two, *OmniClass* number and title, are normative. They are provided as values against which adherence to the *OmniClass* standard can be measured and should not be changed by users. The number and title may be changed by *OmniClass* between editions. The description is informational content, provided to help users decide which classification applies to the object or concept they are classifying. As described above, the GUID is an unchanging machine-readable code that provides a consistent anchor for classifications between editions, regardless of how the *OmniClass* number or title may appear in those editions. Knowing the GUID is not essential for human users of *OmniClass*.

Number	Title	Description	GUID
13-55 11 00	Office Spaces	Space in which business, clerical or professional activities are conducted.	95772f00-6166-11e1-8000-00215ad4efdf

The elements of an OmniClass classification object.

Delimiters Used to Classify Physical Objects

The faceted nature of *OmniClass* allows objects to be classified by combining entries on multiple tables. For most digital objects, multiple *OmniClass* numbers can be applied as additional classifications without symbols or delimiters to combine them. As discussed above in Level of Granularity, rules may be needed to establish shelf order to store physical objects classified using *OmniClass*.

The rules for combining classifications have been simplified dramatically from those first presented in *OmniClass* Application Guide version 1.0.

To combine more than one applicable *OmniClass* classification from more than one *OmniClass* table, combine the *OmniClass* numbers using a plus sign (**+**). The plus sign indicates the conceptual intersection of two or more construction subjects.

As these combinations can be used to indicate a storage location for a physical object, the order of combined class numbers is important. *OmniClass* table classifications should be ordered following the order of the tables from which they are drawn. For example:

To represent the concept "climate control system (HVAC) products for offices," combine the individual class numbers for the classifications covering HVAC system products and office spaces:

13-55 11 00+23-33 00 00

For "high-rise residential apartment building," combine the *OmniClass* numbers for "High-Rise Free-Standing Building" and "Large Complex Multiple Family Residence" construction entities:

11-16 21 21+12-11 17 11

Because of the numerical structure of the *OmniClass* tables, physical object filing or storage order and flat-file classification is numerical. *OmniClass* classes are shown in ascending order by number, arranged first by table number, then by level 1 classification, then by subsequent levels. Where objects are classified using a single *OmniClass* table, those should be filed before any that are classified using entries from more than one table.

Applying a Date to Electronic Records

As *OmniClass* is based on an ISO standard, the ISO standard date format from ISO 8601 *Date and time format* is followed in *OmniClass* dating and versioning. The rules set forth by ISO 8601 are:

- Dates are expressed in a general-to-specific way, the year first, followed by month, then day
- Each of those elements is separated by a hyphen ("-")
- Numbers less than 10 are preceded by a leading zero

Thus, June 1, 2018 would be: 2018-06-01.

Dating a document is not specific to *OmniClass*, but provides an aid to identify versions of information generally. Though *OmniClass* recommends using the ISO date format, dating construction information consistently is equally important.

Glossary of Terms

Although many terms used in *OmniClass* are also defined in the tables that comprise the system, this glossary compiles and adds to some of those definitions while adding some frequently used, industry standard terms.

Note that, as indicated above, *OmniClass* follows ISO 12006-2:2015. In an attempt to harmonize with that standard, many *OmniClass* definitions are drawn from that standard. Terms in ***italics*** below are directly related to *OmniClass table* titles.

Built Environment: the whole of human construction, resulting from physical construction results

Construction Agent: human construction resource

Construction Aid: See **Tool**

Construction Complex: aggregate of one or more construction entities intended to serve at least one function or user activity

Construction Entities by Form: significant, definable units of the built environment comprised of interrelated spaces and elements and characterized by form

Construction Entities by Function: significant, definable units of the built environment comprised of interrelated spaces and elements and characterized by function

Construction Entity: independent unit of the built environment with a characteristic form and spatial structure, intended to serve at least one function or user activity

Construction Object: object of interest in the context of a construction process; a subject for *OmniClass* classification

Construction Process: process which uses construction resources to achieve construction results

Construction Product: See **Products**

Construction Resource: construction object used in a construction process to achieve a construction result

Construction Result: construction object which is formed or changed in state as the result of one or more construction process utilizing one or more construction resource

Discipline: practice areas and specialties of the participants who are performing services during the life cycle of a construction entity, considered in light of education and training required to perform in those disciplines

Element: a major component, assembly, or "constituent of a construction entity with a characteristic function, form, or position"

Facet: used in classification to mean a specific view of a topic to be classified. "By form" and "by function" are two examples of facets

Facility: See **Construction Entity**

Information: data referenced and utilized during the process of creating and sustaining the built environment

Management: control activity in a construction process by one or more construction agents

Materials: basic substances used in construction or to manufacture products and other items used in construction

Object: any part of the perceivable or conceivable world; See also **Construction Object**

Organizational Roles: the technical positions occupied by the participants, both individuals and groups, that carry out the processes and procedures which occur during the life cycle of a construction entity

Phase: periods of time in the duration of a construction project identified by the overall character of the construction processes which occur within it

Process Aids: See **Tools**

Products: components or assemblies of components for permanent incorporation into construction entities; resources used to develop the design and construction of a project that do not become a permanent part of the facility are called **Tools**

Properties: characteristics of construction objects

Services: the activities, processes and procedures provided by participants in the design and construction process, and relating to the construction, design, maintenance, renovation, demolition, commissioning, decommissioning, and all other functions occurring in relation to the life cycle of a construction entity

Space: limited three-dimensional extent defined physically or notionally

Spaces by Form: basic units of the built environment delineated by physical or abstract boundaries and characterized by physical form

Spaces by Function: basic units of the built environment delineated by physical or abstract boundaries and characterized by their function or primary use

Tools: the resources used to develop the design and construction of a project that do not become a permanent part of the facility

Work Results: construction results achieved in the production stage or by subsequent alteration, maintenance, or demolition processes, and identified by one or more of the following: the particular skill or trade involved; the construction resources used; the part of the construction entity which results; the temporary work or other preparatory or completion work which results

Participating in OmniClass Development

Membership in the *OmniClass* Development Committee is voluntary and open to interested organizations and individuals. Participating individuals or their organizations pay their own costs to participate. To join the Committee, go to www.omniclass.org or send an email to omniclass@csinet.org

OmniClass Secretariat

CSI has served as the *OmniClass* Secretariat since the standard's first publication in 2001. CSI maintains and publishes *OmniClass* and protects the CSI Properties through licensing and registrations.

Please contact CSI if you would like to use *OmniClass* for a commercial application, to obtain support and to discuss licensure.

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