OmniClass™

A Strategy for Classifying the Built Environment

Introduction and User's Guide

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Executive Summary

The *OmniClass* Construction Classification System (known as *OmniClass*™ or OCCS) is a new classification system for the construction industry. *OmniClass* is useful for many applications, from organizing library materials, product literature, and project information, to providing a classification structure for electronic databases. It incorporates other extant systems currently in use as the basis of many of its Tables – *MasterFormat*™ for work results, *UniFormat*™ for elements, and EPIC (Electronic Product Information Cooperation) for products.

OmniClass is a strategy for classifying the entire built environment.

OmniClass is designed to provide a standardized basis for classifying information created and used by the North American architectural, engineering and construction (AEC) industry, throughout the full facility life cycle from conception to demolition or reuse, and encompassing all of the different types of construction that make up the built environment. *OmniClass* is intended to be the means for organizing, sorting, and retrieving information and deriving relational computer applications.

OmniClass is for use in organizing many different forms of information, electronic and hard copy, in libraries and archives, and for use in preparing project information, communication exchange information, cost information, specification information, and other information that is generated during the services carried out through the project life cycle.

OmniClass follows the international framework set out in International Organization for Standardization (ISO) Technical Report 14177 - *Classification of information in the construction industry,* July 1994. This document was later established as a standard in ISO 12006-2: *Organization of Information about Construction Works - Part 2: Framework for Classification of Information*. *OmniClass* has been developed under the auspices of the following guiding principles established 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*.

OmniClass consists of 15 tables, each of which represents a different facet of construction information. Each table can be used independently to classify a particular type of information, or entries on it can be combined with entries on other tables 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 (*includes Designed 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

The activities conducted throughout the life cycle of any facility generate an enormous quantity of data that needs to be stored, retrieved, communicated, and used by all parties involved. Advances in technology have increased the opportunities for gathering, providing access to, exchanging, and archiving all of this information for future reference. These advances have also raised users' expectations about the ways this information ought to be made available and how quickly that access should be provided.

Continuing advances in "smart building technologies," "building information model" (BIM) technologies, and construction practices have not only increased the amount and detail of data generated and exchanged, but have also further raised expectations about its use and value as an asset. This increase in the amount and types of information generated, and the AEC industry's subsequent reliance on it, demands an organizational standard that can address the full scope of this information throughout a facility's life cycle. This organizational standard will enable and add certainty to information communicated between parties separated by miles, countries or continents.

The *OmniClass* Construction Classification System (OCCS) is envisioned as the standard that will empower tools to do these things and more.

Industry organizations have begun to realize that a greater degree of harmonization in classifying information is now necessary and possible. This harmonization and reuse of information for multiple purposes is at the heart of the value and cost savings presented by Building Information Models (BIM). The classification tables in the industry-created *OmniClass* address these criteria in an effort to make this harmonization a reality.

The scope of *OmniClass* is designed to encompass objects at every scale through the entire built environment, from completed structures, vast projects, and multi-structure complexes to individual products and component materials. It is designed to address all forms of construction, vertical and horizontal, industrial, commercial and residential. In a break from many of the systems that have preceded it, *OmniClass* also addresses actions, people, tools, and information that are used or take part in the design, construction, maintenance, and occupancy of these facilities.

The development of *OmniClass* is an ongoing process, accessible to all interested parties and designed to allow its content to expand over time to address unmet needs as they arise.

Many facility owners and managers insist on having access to all information generated during a developing project, updated throughout the life of a facility. They want to have access to the data that was used to prompt decisions, the options that were considered, the records of those options and decisions, and the information used to support the decisions made. They need that information to better manage their facilities, as the information will likely become an expected or saleable asset that will be transferred to future owners.

Coordinating the production, storage and retrieval of that information is a daunting task, to which *OmniClass* is perfectly suited.

OmniClass is designed to be used throughout a facility's life cycle, from conception, design, and creation to its eventual demolition, deconstruction, recycling, or re-purposing. The means to address classification through the life cycle are provided by using tables to track and document the phases of the facility life cycle and the changing properties of components and modifications made to the facility as a whole.

The construction industry has traditionally focused on organizing segments of construction information, one portion and one discipline at a time. *OmniClass* has entries to address all aspects of information collection, record keeping, and bidding and contracting requirements, and will serve to expedite the process of continuing facility management, all in one cohesive and realistic vision, enabling the unified storage and eased exchange of all of this information.

The increasing international trade in construction products, and the diversification of consultant and contracting services in different places at differing times, makes nationally and internationally-accepted principles for information organization and the preparation of construction documentation of vital importance to the continued health of the industry. These needs, and others like them, are precisely what *OmniClass* is intended to fulfill.

Background

OmniClass is, in simple terms, a standard for organizing all construction information. The concept for *OmniClass* is derived from internationally-accepted standards that have been developed by the International Organization for Standardization (ISO) and the International Construction Information Society (ICIS) subcommittees and workgroups from the early-1990s to the present.

ISO Technical Committee 59, Subcommittee 13, Working Group 2 (TC59/SC13/WG2) drafted a standard for a classification framework (ISO 12006-2, more information below) based on traditional classification but also recognized an alternative "object oriented" approach, which had to be explored further.

ISO TC59/SC13/WG6 developed an electronic framework (ISO/PAS 12006-3, more information below) for the tagging and managing of objects and their attributes.

These standards, ISO 12006-2: *Organization of Information about Construction Works - Part 2: Framework for Classification of Information*, and ISO/PAS (Publicly Available Specification) 12006-3: *Organization of Information about Construction Works - Part 3: Framework for Object-oriented Information*, define methods of organizing the information associated with construction and affiliated industries, and also promote a standard object-modeling definition for concepts addressed. Of these two standards, ISO 12006-2 has more immediate impact on *OmniClass*, and the OCCS Development Committee has closely adhered to this standard in establishing and defining the tables that make up *OmniClass*.

The Construction Industry Project Information Committee (CPIC) of the UK, which was formed to create *Uniclass*, the UK equivalent to *OmniClass*, has, to date, exploited this standard most successfully by publishing a usable version of *Uniclass* in 1997. It is anticipated that the UK authors will assess *OmniClass* as they work to update their publication.

In addition to the application of ISO 12006-2 in *Uniclass*, the object-oriented framework standardized by ISO/PAS 12006-3 has been adopted by ICIS members in their Lexicon program, and both standards are followed by groups in several other countries that are developing similar classification standards, including Norway, Netherlands, UK, and others in Europe, in concert with the Nordic chapter of the International Alliance for Interoperability (IAI), and the Japan Construction Information Center (JACIC) which is currently working to develop the Japanese Construction Classification System (JCCS), modeled in part on *OmniClass*.

The *OmniClass* Construction Classification System (OCCS) Development Committee believes that following these ISO standards will promote the ability to map between localized classification systems developed worldwide. It is the Committee's hope that organizations in other countries pursuing initiatives similar to *OmniClass* will also strive to be ISO-compatible, thereby enabling smoother exchange of information between them.

As stated by ISO in the text of ISO 12006-2, "Provided that each country uses this framework of tables and follows the definitions given in this standard, it will be possible for standardization to develop table by table in a flexible way. For example Country A and Country B could have a common classification table of e.g. elements, but different classification tables for work results without experiencing difficulties of 'fit' at the juncture.

ISO 12006-2: *Organization of Information about Construction Works - Part 2: Framework for Classification of Information* provides a basic structure of information about construction that is grouped into three primary categories composing the process model: construction resources, construction processes and construction results. These are then divided into fifteen suggested "Tables" for organizing construction information. The *OmniClass* Tables correspond to this arrangement of information:

- Tables 11-22 to organize construction results
- Tables 23, 33, 34, and 35, and to a lesser extent 36 and 41, to organize construction resources
- Tables 31 and 32 to classify construction processes, including the phases of construction entity life cycles

The fifteen tables of *OmniClass* also map to the suggested tables in Section 4 of ISO 12006-2 in the following way:

OmniClass Table 11 – Construction Entities by Function	ISO Table 4.2 Construction entities (by function or user activity) ISO Table 4.3 Construction complexes (by function or user activity) ISO Table 4.6 Facilities (construction complexes, construction entities and spaces by function or user activity)
OmniClass Table 12 – Construction Entities by Form	ISO Table 4.1 Construction entities (by form)
OmniClass Table 13 – Spaces by Function	ISO Table 4.5 Spaces (by function or user activity)
OmniClass Table 14 – Spaces by Form	ISO Table 4.4 Spaces (by degree of enclosure)
OmniClass Table 21 – Elements (*includes Designed Elements*)	ISO Table 4.7 Elements (by characteristic predominating function of the construction entity) ISO Table 4.8 Designed elements (element by type of work)
OmniClass Table 22 – Work Results	ISO Table 4.9 Work results (by type of work)
OmniClass Table 23 – Products	ISO Table 4.13 Construction products (by function)
OmniClass Table 31 – Phases	ISO Table 4.11 Construction entity life cycle stages (by overall character of processes during the stage) ISO Table 4.12 Project stages (by overall character of processes during the stage)
OmniClass Table 32 – Services	ISO Table 4.10 Management processes (by type of process)
OmniClass Table 33 – Disciplines	ISO Table 4.15 Construction agents (by discipline) *(OmniClass Table 33 and Table 34 are both drawn from different facets of Table 4.15, which then can be combined for classification)*
OmniClass Table 34 – Organizational Roles	ISO Table 4.15 Construction agents (by discipline)
OmniClass Table 35 – Tools	ISO Table 4.14 Construction aids (by function)
OmniClass Table 36 – Information	ISO Table 4.16 Construction information (by type of medium)
OmniClass Table 41 – Materials	ISO Table 4.17 Properties and characteristics (by type)
OmniClass Table 49 – Properties	ISO Table 4.17 Properties and characteristics (by type)

ISO/PAS 12006-3: *Organization of information about construction works - Part 3: Framework for object-oriented information* implements the basic approach of ISO 12006-2 but uses the entries on these tables as the defining points (or characteristics) for object-oriented information organization. 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 using a classification arrangement

like *OmniClass*. The framework established by ISO/PAS 12006-3 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 establishing relationships between objects.

From the Foreword to ISO/PAS 12006-3: "While ISO 12006-2 is a standard that reflects many years of refinement of classification systems, ISO/PAS 12006-3 represents not so much new thinking, but a new implementation of established information modeling practice using a new ISO process which aims to bring new work of this kind into use as quickly as possible."

Legacy Sources

One of the guiding principles adopted by the OCCS Development Committee at its initial Sept 2000 meeting was to "Utilize existing systems and compatible initiatives to avoid duplication of effort." The thinking behind this principle is multi-fold. Users of existing classification systems have come to rely on what they provide, and the needs of these users are usually being met by a legacy source. Additionally, all of these systems have been developed and refined over the course of many years, and with the input of many gifted individuals; this talent and insight is too valuable a resource to be overlooked in the development of *OmniClass*.

Using or adapting applicable parts of legacy sources and applying them to the task of compiling *OmniClass* is the most efficient way to avoid spending time reinventing the wheel, allowing Committee members to devote their energy to addressing areas for which classification tables have not yet been developed. Though there are other resources that have been made available for the committee's use, the following are the primary legacy sources from which several of the *OmniClass* tables' content and organization have been drawn and adapted:

- *Uniclass*
- *MasterFormat*™
- *UniFormat*™
- EPIC (Electronic Product Information Cooperation)
- Portions of a few tables published by ASTM International
- Selected resources provided by the U.S. General Services Administration (GSA), the U.S. Army Corps of Engineers, the International Code Council (ICC), and others

For a variety of reasons, including inconsistent terminology and problems with how these systems' content relates to the intended purpose of the tables they provide content for, these systems have generally not been incorporated wholly into *OmniClass* without significant modification. The Committee believes that as *OmniClass* becomes more fully developed, standards such as *MasterFormat* will continue to exist as more or less a single-viewpoint applications and implementations of the much broader *OmniClass*. Acting as applications of *OmniClass* will enable these "legacy" systems to remain focused more on their original purpose, rather than be stretched to accommodate data filing functions to which they have been inconsistently applied and for which some shortcomings in their use have become apparent.

Uniclass

The Unified Classification for the Construction Industry (*Uniclass*) is the UK's equivalent of *OmniClass*, a faceted classification system designed within the parameters of ISO 12006-2 and ISO/PAS 12006-3. The OCCS Development Committee has been in contact with the developers of *Uniclass*, and from an early point in the *OmniClass* development effort, received permission to freely adapt and use portions of the content and structure of *Uniclass* as needed in the development of *OmniClass*. This cross-referencing will also allow for the possibility of the *Uniclass* maintenance team to, in turn, use *OmniClass* as a resource for further refining their document, thereby moving both documents closer to a harmonized international standard.

As mentioned earlier, both *Uniclass* and *OmniClass* draw their table definitions and table concepts from ISO 12006-2. The following chart shows how some *OmniClass* tables also draw from or relate in part to *Uniclass* tables.

OmniClass Table 11 – Construction Entities by Function	*Uniclass* Table D – Facilities
OmniClass Table 12 – Construction Entities by Form	*Uniclass* Table E – Construction Entities
OmniClass Table 13 – Spaces by Function	*Uniclass* Table F – Spaces
OmniClass Table 14 – Spaces by Form	*Uniclass* Table F – Spaces
OmniClass Table 21 – Elements	*Uniclass* Table G – Elements for Buildings *Uniclass* Table H – Elements for Civil Engineering Works
OmniClass Table 22 – Work Results	*Uniclass* Table J – Work Sections for Buildings *Uniclass* Table K – Work Sections for Civil Engineering Works
OmniClass Table 23 – Products	*Uniclass* Table L – Construction Products
OmniClass Table 31 – Phases	*Uniclass* Table C – Management (*in part*)
OmniClass Table 32 – Services	*Uniclass* Table B – Subject Disciplines
OmniClass Table 33 – Disciplines	*Uniclass* Table B – Subject Disciplines
OmniClass Table 34 – Organizational Roles	*Uniclass* Table C – Management (*in part*)
OmniClass Table 35 – Tools	*Uniclass* Table M – Construction Aids
OmniClass Table 36 – Information	*Uniclass* Table A – Forms of Information
OmniClass Table 41 – Materials	*Uniclass* Table P – Materials
OmniClass Table 49 – Properties	*Uniclass* Table N – Properties and Characteristics

MasterFormat

MasterFormat™ is the pre-eminent means for organizing commercial and institutional construction specifications in North America. Initially published in 1963 by the Construction Specifications Institute (CSI) and Construction Specifications Canada (CSC), it has been revised many times since then, and has been used by individuals and companies in all sectors of the construction industry for filing and organizing specifications, product data, and other construction information. Because of this widespread use and long history of development and refinement, including the 2004 edition that expanded its coverage dramatically, making it suitable for use in a broader variety of construction types, *MasterFormat* is the obvious legacy source for the contents of Table 22 – Work Results. *MasterFormat* 2004 Edition was also the first published application of *OmniClass*. As published, it integrates information from other tables in *OmniClass* (chiefly Products) and classifies other information important to its use in construction projects that are not work results.

***A historical note*:** Although *MasterFormat* was initially based on a concept that paralleled "work results," that term was not in common usage until recently. Over the last forty years, *MasterFormat* gradually changed from a listing of specification section titles (mostly work results) into a less disciplined combined listing of work results, products, and materials. The 2004 edition of *MasterFormat* brought the document back to its roots as a listing of work results, with significant changes in its organization, titles, and numbers. *OmniClass* Table 23 – Products includes the product and material titles that were removed from *MasterFormat* in this latest revision, and expands deeper into subjects not previously addressed in *MasterFormat*.

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

UniFormat

UniFormat™ provides a standard method for arranging construction information, organized around the physical parts of a facility called systems and assemblies. These systems and assemblies are characterized by their function without identifying the technical or design solutions that may compose them. The current edition of *UniFormat*, first published in 1998, was developed jointly by ASTM International (formerly the American Society for Testing and Materials), CSI, and CSC. Because *UniFormat* organizes the structures in the built environment by their component elements, a modified version of it was used as a legacy source for the basic organization and contents of Table 21 – Elements.

UniFormat is currently undergoing revision by CSI and CSC. When the new version becomes available, the OCCS Development Committee intends to use its applicable contents as the source for *OmniClass* Table 21, similar to the current relationship between Table 22 and *MasterFormat*.

EPIC (Electronic Product Information Cooperation)

EPIC is an international standard for sharing information between construction product databases, developed as a result of a 1990 agreement between representatives from ten European countries. It was clear that a standardized organization for product information databases would be increasingly needed for the developing electronic marketplace. The published work of this group was issued as EPIC Version 1 in 1994. EPIC version 2, refined through the commentary received on Version 1, was offered for practical application in 1999. The framework for EPIC version 2 was ISO 12006-2 – *Organization of Information about construction works – Part 2 Framework for Classification of Information*.

Though the EPIC standard has since ceased to be updated, the OCCS Development Committee has chosen to use EPIC as the basis for *OmniClass* Table 23 – Products. The organization of Table 41 – Materials and Table 49 – Properties has also been enhanced and informed by the EPIC Product Attributes, Tables X and Y respectively.

ASTM International Classification Tables

In recent years, ASTM has developed tables for organizing information for several civil engineering disciplines. The *OmniClass* Development Committee has assessed several of these tables in their primary form and scope, selected certain core subject categories, and reorganized them alongside other non-civil subjects into a more global perspective within a defined strategy for *OmniClass* Table 21.

OmniClass Table Structure and Implementation

Classification Table Concept – Overview

The organization of the *OmniClass*™ Tables is based on the segregation of information types to be classified into a set of discrete, coordinated tables. The information contained in each table exists, and is organized, based on a specific facet or view of the total information that exists in the built environment. There has been much work put into the interaction of these tables since the initial OCCS draft for comment and review was published in October 2001, as both the increase in the number of tables and the refinement of their entries in this edition show.

Work has already begun on defining the ways that classification table entries can be combined to refine the classification of an object or concept by the International Alliance for Interoperability (IAI). It is expected that the entries from *OmniClass* tables will also help to define and refine the characteristics used in IAI's IFC (Industry Foundation Classes), XML metadata entries, and other means of information distribution, storage, and retrieval. This will enable industry users to classify and store information in uniform ways so that other users can locate that information from a number of facets or viewpoints in consistent ways, using standardized terminology.

As development has progressed, the *OmniClass* developers have identified object classes to as much detail as required by each table to solve most users' classification needs. Not all of the tables are developed to the same degree; some have much more extensive top level listings and more depth of entries than others, simply due to the depth and complexity of their subject matter. The number of top level classes in any given table is designed to number as few as possible, in order to offer users a manageable number of categories to browse and work with. The level of detail in the subclasses of each table can be as extensive as needed.

Usability, of course, dictates limiting expansion in both breadth and depth as much as possible. The ease of implementation is important in addressing *OmniClass*' table structures, as well as the definitions and facets of the tables that make it up. Although it is designed so that it can be used for hard copy classification (classic physical storage methods), the real power of *OmniClass* is dependent upon its implementation in computer (primarily relational or object-oriented database) technology, using that technology's ability to relate information from a variety of perspectives and to produce reports from all perspectives. The end result is an information management tool that is more flexible and powerful than any simple flat-file storage system.

Conceptually, the individual tables that refer to built structures (Tables 11 and 12) or their component parts (Tables 13, 14, and 21 through 23) can be arranged into groups that are organized around broad-based facets at the "top," and which are more detailed at the "bottom." From an application perspective, within these groups of tables the "lower" level table should assume some kind of continuation of the table just "above" it, albeit possibly viewed from a different perspective or facet. For example, the members of each of the construction entities (by function and by form) tables can all contain elements, which contain products, etc.

The subjects addressed at any level within a table are sufficiently broad in their definitions and dispersed in their organization that they will allow for easy and logical expansion for new or innovative products or technologies that may be introduced to the industry, and for expansion and growth of existing subjects that may currently be unaddressed or underserved for whatever reason. This can all be accomplished without any disruption to existing categories and to permit reasonably deep subordinate expansion of any heading.

Perhaps most importantly, the *OmniClass* tables are designed to work together to provide extremely granular, or specific, classification. Depending on the complexity of the object being classified, and the level of detail desired, an object can have occurrences in one, two, or more tables. Occurrences on multiple tables can then be combined using the rules outlined in the *OmniClass* Application Guide. This classification can then be combined with values drawn from applicable entries on Table 49 - Properties, providing a highly granular level of indexing that will be extremely useful to databases and other computer applications.

Table of Tables

Below is a full list of the *OmniClass* tables, with a brief description of their important features. Definitions of the terms used and examples are given in the introductions to each of the tables.

Table 11 – Construction Entities by Function	**Definition: Construction Entities by Function** are significant, definable units of the built environment comprised of elements and interrelated spaces and characterized by function.
	Examples: Single Family Residences, Mining Facility, Local Transit Bus Station, Interstate Highway, Waste Water Treatment Facility Freezer Storage Facility, Department Store, Courthouse, Hotels, Convention Center
	Discussion: A construction entity is complete and can be viewed separately rather than merely as a constituent part of a larger built unit. An office building is a construction entity, but a conference room within the building is a space. Function is the purpose or use of a construction entity. It is defined by primary occupancy, and not necessarily by all activities that can be accommodated by the construction entity. Construction entities usually also have physical form and location. This table is not concerned with physical form; that is the basis of **Table 12 - Construction Entities by Form**. There is a correlation between form and function; function may dictate form, as illustrated by a baseball park. Other construction entities can accommodate several functions throughout their useful life; for instance, a mid-rise building can have residential, educational, or business functions.
	Legacy Sources: IBC, BOCA, UBC, and other building code occupancy classifications; ISO 12006-2 Table 4.2 - Construction Entities (by function or user activity) and Table 4.6 - Facilities; and *Uniclass* Table D – Facilities, Appraisal Institute Commercial Data Standards.
Table 12 – Construction Entities by Form	**Definition: Construction Entities by Form** are significant, definable units of the built environment comprised of elements and interrelated spaces and characterized by form.
	Examples: High-Rise Buildings, Suspension Bridge, Platform, Space Station
	Discussion: A construction entity is complete and can be viewed separately rather than as a constituent part of a larger built unit. A skyscraper is a construction entity, but a shaft that extends the height of the skyscraper is classified as a space. Construction entities classified by this table have a site and physical form. This table is not concerned with function; that is the basis of **Table 11 - Construction Entities by Function**. Tables 11 and 12 can be used together to classify both form and function of construction entities. For instance, a high rise building form can be combined with a residential function to classify a high rise apartment building. Note that in common usage many terms used to describe form-driven construction entities are also used to describe spaces and/or functions.
	Legacy Sources: ISO 12006-2 Table 4.1 - Construction Entities (by form), *Uniclass* Table E - Construction Entities.
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 function.
	Examples: Kitchen, Mechanical Shaft, Office, Highway

	Discussion: A space is a part of the built environment that is marked off in some way. It is usually a component forming a larger, more significant construction entity. A space can be delineated by either physical or abstract boundaries. Often these are environmental parameters such as walls and roofs which separate the interior "space" from that which bounds it (other spaces, elements). Other spaces, like an airport approach zone are delineated by non-corporeal, abstract boundaries. Spaces have a purpose or use. This is their function and forms the basis of this table. Spaces can be occupied by people, things, and substances and serve as mediums for activities and movement. Spaces also have physical form and this is the concern of **Table 14 - Spaces by Form**. There may or may not be a correlation between the form of a space and its function. Most spaces can accommodate many different functions throughout their useful life.
	Legacy Sources: Reference to made to 'basic human functions and activities' as might be found in anthropology texts; ISO 12006-2 Table 4.5 Spaces (by function or user activity); *Uniclass* Table F, Spaces, U.S. General Services Administration (GSA) space definitions, International Code Council (ICC) space definitions, Appraisal Institute Commercial Data Standards
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
	Discussion: A space is a segment of the built environment that is marked off from other spaces and elements in some way. It is usually a component part of a larger, more significant construction entity. A space can be delineated by either physical or abstract boundaries. These boundaries determine the form of the space which can be three-dimensional such as a room, or a mere surface such as a walkway. The form of the space can create a medium for action or movement which is related to the function of the space. Many spaces are also largely unoccupied, but serve a function within the facility. This table is only concerned with form; **Table 13 - Spaces by Function** is concerned with the purpose or uses of a space.
	Legacy Sources: ISO 12006-2 Table 4.4 Spaces (by degree of enclosure); *Uniclass* Table F, Spaces.
Table 21 – Elements (Including Designed Elements)	**Definitions:** • An **Element** is a major component, assembly, or *"construction entity part which, in itself or in combination with other parts, fulfills a predominating function of the construction entity"* (ISO 12006-2). 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. • A **Designed Element** is an *"Element for which the work result(s) have been defined."* (ISO 12006-2).
	Examples: Structural Floors, Exterior Walls, Storm Sewer Utility, Stairs, Roof Framing, Furniture and Fittings, HVAC Distribution

	Discussion: An element fulfils a characteristic predominant function, either by itself, or in combination with other elements; Table 21 is organized by elements' implied functions. Major elements may be composed of several sub-elements. For example, a shell enclosure might be composed of superstructure, exterior closure, and roofing. Currently, elements are most often used during early project phases for identifying a project's physical, operational, or aesthetic characteristics. Elements are considered without regard to a material or technical solution of the function. For each element, there may be several technical solutions capable of accomplishing the element function, and more than one may be selected for a project. These solutions are the designed elements. Many applications exist for element-based classification. OmniClass Table 21 – Elements can provide a useful way to organize and classify elements at the early stages of a project, before particular or specific materials and methods (designed elements) have been determined, and help to conceptualize the project without the restrictions imposed by any particular design solution. The Elements Table can be used to organize information such that it can be used to stimulate project decisions, record those decisions (and subsequent changes), and can also be used as a basis for organizing documents to form a contractual commitment between two or more parties on a project. These usually take place at an early design development stage, but may occur at any project stage or phase.
	Legacy Sources: *UniFormat*™ (CS1/CSC 1992, 1998), ISO 12006-2 Table 4.7 Elements (by characteristic predominating function of the construction entity) and Table 4.8 - Designed Elements (element by type of work), *Uniclass* Table G - Elements for Buildings, *Uniclass* Table H - Elements for Civil Engineering Works, ASTM E1557 *UNIFORMAT II*, A variety of ASTM "format" documents addressing specific classification of subjects associated with these element tables
Table 22 - Work Results	**Definition: Work Results** are construction results achieved in the production stage or phase 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 of work which is the result.
	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
	Discussion: A work result represents a completed entity that exists after all required raw materials, human or machine effort, and processes have been provided to achieve a completed condition. Since facility owners ultimately desire a completed entity, specifiers routinely specify contractual requirements by work result, and minimize the specifying of details about how to achieve that result to contractors. Table 22 provides a classification arrangement that organizes information most appropriately from the viewpoint of identifying the "results of work" required to provide all or part of a facility. Table 22 – Work Results is based almost entirely on an existing publication called *MasterFormat*, which has been a standard means of organizing construction information in North America since the 1960s. The 2004 edition of *MasterFormat* is also the only legacy document that was modified with OmniClass in mind, to eventually serve as one of the *OmniClass* tables and be coordinated with other related tables. A work result may pertain to several manufactured products (an assembly) such as exterior insulation and finish system, or to a single product such as a framed marker board. A work result could also involve only labor and equipment which are utilized to achieve the desired result, such as trenching.

	Legacy Sources: *MasterFormat*™ *2004 Edition*, ISO 12006-2 Table 4.9 - Work Results (by Type of Work), and *Uniclass* Table J - Work Sections for Buildings and Table K - Work Sections for Civil Engineering Works.
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
	Discussion: Products are basic building blocks used for construction. A product may be a single manufactured item, a manufactured assembly of many parts, or a manufactured operational stand-alone system. This table provides a basis for identifying products categorized by number and name in a unique location. Table 22 – Work Results on the other hand, provides multiple classifications for any given product dependent upon the application (or work result) the product is employed in. An example is a panel of glass, which can have many work result locations such as in a window, as cabinet shelving, or in an interior sidelight to a door opening. Basic materials are also considered to be products when they are used in their original form as a component to achieve a construction work result. An example is sand used as a subbase cushion for brick paving. Sand is also a constituent material of other products such as items made from precast concrete. Hence base materials like sand occur both in this table and in **Table 41 – Materials**. The focus of Table 41 – Materials is the basic composition and physical properties of materials without regard to composition or use.
	Legacy Sources: *Uniclass* Table L – Products, EPIC (Electronic Product Information Cooperation), *MasterFormat*, ISO 12006-2 Table 4.13 – Construction Products (by function).
Table 31 – Phases	**Definition:** Life cycle phases are often represented by two terms used somewhat interchangeably in our industry. For the purposes of clarity and standardization, OmniClass offers two specific definitions for their usage in OmniClass Tables: **Stage:** A categorization of the principal segments of a project. Stages usually are: Conception, Project Delivery Selection, Design, Construction Documents, Procurement, Execution, Utilization, and Closure. **Phase**: A portion of work that arises from sequencing work in accordance with a predetermined portion of a Stage. For purposes of usage in OmniClass classifications, a Stage is a higher-level of categorization and a Phase is a subordinate level of titling within a Stage.
	Examples: Conception Stage, Schematic Design Phase, Bidding Phase, Construction Phase, Occupancy Phase, Decommissioning Phase

	Discussion: This table provides the time and activity dimension for the process of creating and sustaining the built environment. A "project" can be defined as a planned undertaking consisting of a process or set of procedures to accomplish a task. In a projects early context, Stages are identified and defined relative to a specific project and its tasks. Phases are portions of time and activity efforts within any Stage that are usually defined later. The scope of a construction project can vary from tiny - for instance changing a filter on a mechanical unit - to gargantuan - like designing and constructing a below grade expressway through a dense urban environment. Projects take place over time and are composed of one or more Stages with their subordinate activities - Phases. These occupy segments of time and represent specific activities that occur between changes in substance or process. These Stages or Phases do not endure forever; they are transitory. A Stage is often marked by one or more accomplishments or deliverables. Generating a deliverable constitutes the end of a Stage or Phase. Transition from one Stage or Phase to the next is an indication of accomplishment, progress, or advancement.
	Legacy Sources: CSI Project Resource Manual (PRM), CSC Manual of Practice, Total Cost Management Framework AACE International, ISO 12006-2 Table 4.11 Construction entity life cycle stages (by overall character of processes during the stage) and Table 4.12 Project stages (by overall character of processes during the stage)
Table 32 – Services	**Definition: Services** are the activities, processes and procedures 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: Designing, Bidding, Estimating, Constructing, Surveying, Maintaining, Inspecting
	Discussion: The Services Table is based around actions, which includes any service exercised or provided that influences the built environment. Services are all of the actions that are performed by the various participants in creating and sustaining the built environment, throughout the full lifespan of any construction entity.
	Legacy Sources: *Uniclass* Table B - Subject Disciplines, ISO 12006-2 Table 4.10 Management processes (by type of process), AIA Information Classification System Part 2 Hierarchical Listing May 1, 1989
Table 33 – Disciplines	**Definition: Disciplines** are the practice areas and specialties of the actors (participants) that carry out the processes and procedures that occur during the life cycle of a construction entity.
	Examples: Architecture, Interior Design, Mechanical Engineering, General Contracting, Electrical Subcontracting, Legal, Finance, Real Estate Sales
	Discussion: Disciplines are the practice areas and specialties of the participants who are performing services during the life cycle of a construction entity, considered without regard to the actual job functions of individuals or teams, which is covered by **Table 34 – Organizational Roles**. Disciplines from **Table 33** can be combined with entries from **Table 34 - Organizational Roles** to provide a full classification such as an electrical subcontracting (discipline) supervisor (organizational role).
	Legacy Sources: *Uniclass* Table B - Subject Disciplines, ISO 12006-2 Table 4.15 - Construction Agents (by discipline), and AIA Information Classification System, Part 2 - Hierarchical Listing (May 1989).

Table 34 – Organizational Roles	**Definition: Organizational Roles** are the functional 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. **Table 34** can be combined with **Table 33 – Disciplines**, to provide a full classification of each participant in the creation and support of a facility.
	Examples: Chief Executive, Supervisor, Owner, Architect, Cost Estimator, Facility Manager, Specifier, Contractor, Administrative Assistant, Equipment Operator, Apprentice, Team, Committee, Association
	Discussion: The key concepts underlying **Table 34** are the scope of responsibility given to a participant within a given context and the participant's job function, largely without regard to areas of expertise, education, or training. Some organizational roles imply specific areas of expertise, but in general those subjects are addressed more fully by **Table 33 – Disciplines**. A participant can be an individual, a group or team of individuals, a company, an association, an agency, an institute, or other similar organization. Organizational roles, when combined with entries from **Table 33 – Disciplines,** can further define a participant in the process of creating and sustaining the built environment. An example would be an electrical subcontracting (discipline) supervisor (organizational role).
	Legacy Sources: *Uniclass* Table B - Subject Disciplines, ISO 1200006-2 Table 4.10 - Management Processes (by type of process), and AIA Information Classification System, Part 2 - Hierarchical Listing (May 1989).
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
	Discussion: Tools are equipment, implements, supplies, software, and other items necessary for creating and sustaining the built environment, but which do not become parts of the final construction entity. They are used by the many participants to perform various services.
	Legacy Sources: *Uniclass* Table M - Construction Aids and AIA Information Classification System, Part 2 - Hierarchical Listing (May 1989), ISO 12006-2 Table 4.14 Construction aids (by function).
Table 36 – Information	**Definition: Information** is data referenced and utilized during the process of creating and sustaining the built environment.
	Examples: Reference Standards, Periodicals, CAD Files, Specifications, Regulations, Construction Contracts, Lease Documents, Title Deeds, Catalogs, Operation and Maintenance Manuals
	Discussion: Entries on the **Information** table refer to information resources that can be referenced or created in the creation and support of the built environment. Information can exist in various media including both printed and digital forms. Information can include general reference and regulatory data such as a manufacturing standard, or it can be project specific, such as a project manual. Information is the principle tool for communication during the process of creating and sustaining the built environment. Typically information needs to be filed, stored, and retrieved.

	Legacy Sources: *Uniclass* Table A - Forms of Information and AIA Information Classification System, Part 2 - Hierarchical Listing (May 1989), ISO 12006-2 Table 4.16 Construction information (by type of medium).
Table 41 – Materials	**Definition: Materials** are 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 considered subjects of this table irrespective of form.
	Examples: Metallic Compounds, Rocks, Soils, Timber, Glass, Plastics, Rubbers
	Discussion: This table classifies the basic resources that construction products and tools are made from. The entries describe the basic composition of these substances without regard to the form the material takes. Because many material names commonly imply a certain form, any apparent overlap between this table and **Table 23 – Products** is exactly that, an apparent but not an actual overlap. The entries on this table are names that can be applied to the Property "material," and do not have expressed forms because they are not intended to represent the actual items used in the creating and sustaining the built environment. This table is not intended to be an exhaustive list of possible material names. Any composition that can be described without implicitly or explicitly defining the form would be included in this table. Forms are characteristics like "board," "bar," "sheet," "block," etc. An example of this is "aluminum" – aluminum is a chemical composition. Although aluminum products come in bars, sheets, and other forms, the term aluminum describes the "material" each of those products is made of. Other types of materials included in this table are raw material names that usually encompass both chemical composition and form, because they are found in nature in certain forms. For example, the chemical composition of "sand" is silicon dioxide, but because sand is a naturally occurring form of silicon dioxide and because we use sand as a constituent material of other products, we include it in this table. The fact that sand is also a product used in its own right, in its original form, it will also show up in **Table 23 – Products**.
	Legacy Sources: *Uniclass* Table P - Materials, ISO 12006-2 Table 4.17 Properties and characteristics (by type), EPIC (Electronic Product Information Cooperation) "Constituent Materials" table, CI/SfB Construction Indexing Manual
Table 49 – Properties	**Definition: Properties** are characteristics of construction entities. Property definitions do not have any real meaning out of context -- without reference to one or more construction entities.
	Examples: Common properties include Color, Width, Length, Thickness, Depth, Diameter, Area, Fire Resistance, Weight, Strength, Moisture Resistance
	Discussion: The members of many of the other *OmniClass* tables are construction entities (objects), expressed as nouns (for things) or verbs (for activities). Properties serve as modifiers of these objects -- adjectives and other modifiers. This table is limited to properties that are common to, or shared by, two or more construction entities. The names of properties that are unique or specific to a certain construction object *do not* currently appear in this table except as examples. Factors are things or characteristics of things that influence the nature of a property and are expressed as nouns. Many factors have a direct relationship to a single property that they influence, which is indicated by the terminology used. Other factors influence many different properties, which together represent the effect the factor has on the object. A factor may influence a property during its design or selection or after construction, as stresses or degrading influences. Because there is not necessarily a one-to-one relationship between factors and properties, this table also includes a classification scheme for factors that influence properties of construction entities.

	Legacy Sources: *Uniclass* Table N – Properties and Characteristics, ISO 12006-2 Table 4.17 – Properties and Characteristics (by type), ISO 31-0 – Quantities and Units, BS 6100 Glossary of Building and Engineering Terms, EPIC (Electronic Product Information Cooperation), IEEE/ASTM SI 10-1997, *Standard for Use of the International System of Units (SI): The Modern Metric System*, CI/SfB Construction Indexing Manual, IAI-NA Project Management Domain Specification project

OmniClass Application Guide

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Implementation: Table Status

Not all *OmniClass* tables as published are at an equal level of completion. All tables are expected to receive commentary and to have their contents augmented in response to this commentary, but the nature of these expected changes is different for different status tables. In short, the tables that are being published at "Release" status are ready for implementation; others have contents that members of the OCCS Development Committee think are likely in need of more input, commentary, and development. Comments will be accepted and acted upon for all tables regardless of publication status.

There are three table publication statuses:

1. **Release** – Contents of these tables are expected to grow, but the OCCS Development Committee has a high degree of confidence in the framework and contents of the table as presented, and as a result the basic organization of the table is not expected to change. These tables have a good "foundation."
2. **Draft** – The basic framework of these tables is not viewed as complete. As a result, it is possible that the basic structure of the table may undergo some measure of significant revision in response to commentary before the table is published as a "Release."
3. **Conditional Draft** – This status is identical in most respects to Draft status, but the likelihood of dramatic change to the basic structure of the table is much higher, due to conditions outside the direct control of the OCCS Development Committee, such as changes in legacy resource documents that may be taking place.

Table 11 – Construction Entities by Function	2006-03-28 **Release**
Table 12 – Construction Entities by Form	2006-03-28 **Release**
Table 13 – Spaces by Function	2006-03-28 **Release**
Table 14 – Spaces by Form	2006-03-28 **Release**
Table 21 – Elements	2006-03-28 Conditional Draft
Table 22 – Work Results	2006-03-28 **Release**
Table 23 – Products	2006-03-28 Draft
Table 31 – Phases	2006-03-28 **Release**
Table 32 – Services	2006-03-28 **Release**
Table 33 – Disciplines	2006-03-28 **Release**
Table 34 – Organizational Roles	2006-03-28 **Release**
Table 35 – Tools	2006-03-28 Draft
Table 36 – Information	2006-03-28 Draft
Table 41 – Materials	2006-03-28 **Release**
Table 49 – Properties	2006-03-28 Draft

Numbering Conventions

The legacy sources used as references to develop *OmniClass* tables have unique numbers assigned to the entries they classify. The OCCS Development Committee has assigned numbers to all entries in *OmniClass* tables, and will continue to assign numbers throughout its development. Rather than adopting the pre-existing legacy source numbering schemes where they exist, *OmniClass* numbers will be selected to correspond to a

broader numbering strategy and may or may not correspond in any way to the legacy numbering scheme. As *OmniClass* numbers are assigned, the Committee will map the *OmniClass* numbers to the legacy numbering systems as needed.

The purpose of numbering *OmniClass* entries is chiefly as a way to map and communicate locations in the tables and illustrate hierarchies for human users, however it is possible and indeed preferable for database applications to use the published *OmniClass* numbers as data locations, as doing so will enable more reliable information exchange. The primary purpose for numbering is to provide a mental map to an object's location (for humans) within a set of relatively large classification tables, easing communication about *OmniClass* entries between human users, and quickly clarifying the hierarchical level and location of any entry with respect to other entries.

The question about whether to use an alphanumeric system (combining letters with numbers) or a purely numeric system was addressed by the members of the OCCS Development Committee. The committee decided to use a purely numeric system for a variety of reasons:

- The widespread use of letters in other formats, where the same letters often have designations that are not in agreement. *Uniclass*, *UniFormat*, EPIC (Electronic Product Information Cooperation), and the United States National CAD Standard (NCS), among others, all use letters accompanied by numbers as designators for entries. Some of these letter designations are assigned in a mnemonic fashion, in some the designations are purely arbitrary. There is virtually no agreement about what any given letter should stand for between these standards. Since *OmniClass* evolved from *Uniclass*, *UniFormat*, and EPIC as legacy documents, adopting alpha-numeric designations to *OmniClass* would only add to the confusion.
- Asian countries, some of which have expressed an interest in *OmniClass*, cannot easily use alphanumeric coding that is based in part on the ASCII Latin1 alphabet. Purely numeric coding does not present this problem.
- There may be visual identification problems with the use of some letters in combination with numbers, especially when viewed with sans serif fonts. The lower and uppercase letter "O" (o, O) uppercase "i" (I) and lowercase "L," (l) could each invite problems due to their great potential for confusion with the numbers 0 and 1.

For this reason, a purely numeric approach has been selected when assigning numbers to classes in the *OmniClass* tables. Two basic concerns were expressed early on in the development of the rules by which these numbers should be chosen:

- The numeric system should have the capability for needed expansion within any level of classification to avoid concern about "running out of available numbers."
- The strategy should be potentially limitless, having an open-ended structure in terms of levels that are available and will accommodate as much depth of classification as may be required within any table.

In light of these concerns, *OmniClass* numbering rules are as follows:

- A pair of digits will designate the table number (i.e. 11, 12, 13… 36, 41, 49). **The patterns that number sequences follow on some tables at each level (11, 14, 17, 21…, 11, 21, 31, 41… etc.) are of no particular importance; any numbering sequence, or no sequence in particular, could have just as easily been chosen.**
- Additional pairs of digits will designate each level of classification. This will provide 99 spaces for entries at each level within a table. Leading zeros are used for the first nine entries in each level, 01-09.
- The double zero entry (00) is a special number used to signify no entry at any given level. It is used in most tables to fill out a numerical string for a higher level (conceptually broader) entry to six digits (such as 05 00 00). Double zero levels do not exist in *OmniClass*.
- Increasing depth 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 the need for depth of classification on a table exceeds three levels, additional pairs of numbers will be added to represent each additional level of classification that is required.

Implementation: Symbols and Delimiters

All *OmniClass* Tables have a number that precedes the number affixed to each of its entries, separated by the dash symbol "**-**" as a delimiter. For example, an entry on Table 12 with the number 11 21 00, is displayed as 12-11 21 00.

The OCCS Development Committee has drafted the following rules for using symbols to combine entries to refine the classifications applied to objects. The specific purpose to which *OmniClass* is applied will dictate how useful these guidelines are; they will likely be very useful in applying *OmniClass* to flat-file databases, tagging data with appropriate *OmniClass* classifications, or cataloging library materials or other physical objects, but may be less useful when applied in a relational database.

Two primary symbols are used to combine entries to create class numbers for more detailed classification. These are the plus sign "**+**" and the slash symbol "**/**." There are two additional symbols that are less applicable for general use, the less-than symbol "**<**" and the greater-than symbol "**>**." The most-used symbol is likely to be the plus sign, since it is used for combining facets, whether from within the same table or between different tables.

The plus sign "**+**"is used to indicate the conceptual intersection of two or more construction subjects. For example, to represent the concept "climate control system (HVAC) products for offices," one may combine the individual class numbers for the subjects covering HVAC systems and office spaces with the plus sign, giving **23-75 00 00+13-15 11 34 11**. For another example, a "high-rise residential apartment building" can be represented by the intersection of "High-Rise Free-Standing Building" and "Large Complex Multiple Family Residence" construction entities – **11-16 21 21+12-11 17 11**. The plus sign does not specify which subject influences the other, nor does it show the nature of the influence exerted.

The slash sign "/" is used to indicate a broad range of **consecutive** classes within a single table that are applicable to an object's classification. For example, if we wanted to identify all "work results" related to mechanical and electrical construction it could be shown as **22-21 00 00/22-28 46 29**.

The less-than and greater-than symbols "**<**, **>**" are used to indicate that one construction object is part of another. For example **13-15 11 34 11<11-13 24 11** means "office spaces which are part of a hospital," and **21-41 71 11 31<11-17 11 00** means "internal partitions (walls) that are part of an office facility."

The order of class numbers is important for these signs because it both signifies the more significant object and affects the order of filing. In some cases it might be desirable to file the information under the concept that is more central to the object being classified, and still preserving the meaning. To achieve this, the order of the class numbers is changed and the sign must also be changed from a less-than sign to a greater-than sign; e.g. **11-13 24 11<13-15 11 34 11** still means "offices which are part of a hospital," but would now be filed in the hospitals section rather than the offices section. In all cases, the rule is that the open end of the sign will be adjacent to the number representing the more significant object. The less-than and greater-than symbols are, in effect, specialized versions of the plus symbol that attach a specific meaning to the relationship between the class numbers.

These symbols have not been used in any of the *OmniClass* tables, and are only intended for use in special applications, chiefly in flat-file classification, or cataloging physical objects. In any case, it is clear that some objects are always subsumed by others and not vice versa; in the elements table, for example, a window is always part of a wall.

The *OmniClass* notation, like the organization of the tables, is hierarchical. This means that if you do not require the full detail of the entries presented in an *OmniClass* table, you can omit lower level digits and simply classify at a higher (broader) level in the hierarchy. This allows *OmniClass* to be used in many different situations, with varying degrees of detail. For example, an object could be classified at a broader level by using **11-13** instead of **11-13 27 11**.

Filing order

Because of the numerical structure of the *OmniClass* tables, the filing order for flat-file classification is rather simple and straightforward; *OmniClass* classes are shown in ascending order, first by table number, then level 1 classification, then by subsequent levels. If two tables are being used together to identify a subject then the lowest numbered tables are generally shown first, unless some other reason marshals for classifying an object under the concept that occurs later numerically as explained below under "Citation Order."

For example, **11-52** files before **32-61**.

The filing order of signs is given below; this is important when filing documents classified using combined codes. Though they are not both included in the order given below, greater-than ">" and less-than "<" symbols are equivalent.

/	**11-17 11/11-17 24**	Office and retail facilities
simple number	**11-17 11 11**	An office building which is headquarters for an organization
+	**21-51 51 00+13-15 11 34 11**	Climate control system (HVAC) products for office spaces
<	**13-15 11 34 11<11-13 24 11**	An office space which is part of a hospital

This filing order for signs follows the rule "the general files before the specific."

Classifying the scale or complexity of construction works

With *OmniClass*, different scales or complexities of construction works are recognized. In order of decreasing scale or complexity, these are:

- construction complexes
- construction entities
- spaces
- elements

In many cases, it will not be necessary to distinguish between construction complexes and construction entities. For example, both office complex and office building may be classified in Table 11 – Construction Entities by Function. However, if it is necessary to make this distinction of scale, then the appropriate class number from Table 12 – Construction Entities by Form may be combined using a plus with the **11-17 11**, resulting in **11-17 11+12-27 17 21** for an office complex or **11-17 11+12-11 17 11** for a high-rise free-standing office building.

Citation order

The citation order is the order in which codes are cited when assigning a combined class number. For example, do we assign the code **11-11 21+12-17 11 12** or the code **12-17 11 12+11-11 21** to the subject "temporary staging for entertainment?" The two orders of code both mean the same thing, but one will have to be chosen as the main number at which, for example, a book is filed on a shelf.

The default *OmniClass* citation order is the same as the filing order, thus in the above example we would use the code **11-11 21+12-17 11 12**. However, it is still possible for users of *OmniClass* to set their own citation order for particular uses, provided they are not concerned about the exact compatibility of the codes they assign with codes that someone else in another organization assigns.

OmniClass Examples

As a typical example, we'll consider the library catalog in an architect's office. The aim here is to avoid overcomplicating the process; as a result we'll use *OmniClass* at the simplest level appropriate for each example.

Example 1: Simple use for a small collection of manufacturers' technical catalogs.

At the most simple level, you can use just a single *OmniClass* table without any combined codes, at a very broad level of detail. For a small collection of trade literature describing construction products the most appropriate table to use would be Table 23 – Products. A single code from Table 23 – Products should be assigned to each item of literature. For example, if you have an item of trade literature on casement windows, in this application the code **23-30 20 17 21 14** would be appropriate.

Example 2: A larger collection of manufacturers' catalogs with multiple manufacturers or types of products.

If the collection of trade literature is larger, it would be appropriate to extend the simple use of *OmniClass* given above in one or more ways. Options include:

- using the longer, more specific codes from Table 23 – Products;
- using codes from one other table as modifiers for the base numbers from Table 23 (for example, entries from Table 41– Materials could be used as qualifiers where necessary, i.e. aluminum windows could be classified as **23-30 20+41-10 20 13**);
- using codes from more than one other table as modifiers for the base number from Table 23 (for example, codes from both Table 41– Materials or Table 11 – Construction Entities by Function could be used as qualifiers where necessary, so that, as well as the above example for aluminum windows, you could classify floor tiles for swimming pools as **23-35 50 14 14+11-15 21 21 11**).

Example 3: A small but more complex collection of information related to an architectural practice.

This collection is complex, containing documents of different types. For example, in addition to trade literature, there are reference books on a number of different subjects, a collection of reference standards, and documents explaining building codes and cost information on different types of facilities. For a small collection, avoid the complication of combined codes and simply assign a single code from a particular table to each document.

The procedure for classifying a document may then be:

- Determine which table is each document best classified by? For example, trade literature is likely best classified by **Table 23 – Products**; reference books may be best classified according to **Table 33 – Disciplines**; reference standards and the documents explaining building codes would best be classified by **Table 36 – Information**; cost information is likely to be best classified using **Table 21 – Elements** or **Table 22 – Work Results** depending at what level of detail the costing applies.
- Then, determine which code from each table is most relevant for each document. It is likely that a short code from any one table will be sufficient.

Example 4: A large architectural and engineering design firm with an extensive technical library.

For large, complex collections, it may be useful to combine codes from more than one table (or possibly multiple codes from a single table) to classify the concepts contained in a document or other piece of information. The decisions on how to classify a document in this situation can be made by considering the following questions:

- What are the concepts contained in the document?
- Which table do we use to classify each concept?
- How do we combine the codes? In other words, what symbol do we use between codes?

Use of *OmniClass* with computerized information

OmniClass is compatible with information stored in computerized databases, and most existing database can simply have a field added to accept *OmniClass* codes. As many codes as are applicable can then be assigned to each item in the database, and reports can be produced based on *OmniClass* codes, allowing the information so classified to be sorted and retrieved for a variety of purposes.

Applying a Date to Electronic Records

Construction documents created by users are often drafts which develop over time until a consensus or agreement is reached to make the document final. All of these drafts should be dated according to date of creation or revision. This could apply to all documents created and classified by *OmniClass* tables. The date of the document is usually important to different people for differing reasons.

Dating a document is an issue that is not specific to *OmniClass* but to help identify electronic records in general. To assist in retrieving "like" information, consider dating the file name or record number by using the ISO international standard for dating. Very simply, this standard displays a date such as February 12th 2006 in the following fashion: "2006-02-12." The sequence is year/month/day using 4 digits for the year, 2 digits for the month and 2 digits for the day, all separated by dashes.

If your computer operating system has a "date display default" feature, it may be best to configure it with these settings. Windows Operating Systems can be configured by clicking on "Start" at bottom left corner of the screen, then select "Settings," "Control Panel," "Regional and Language Options." In the "Regional Options" tab, select "Customize," then select "Date" and configure accordingly.

Glossary of Terms

Many terms used in *OmniClass* are also defined in the tables that comprise the system, but this glossary compiles and adds to some of those definitions and also defines some additional terms that are frequently used in this industry standard.

Note that, as indicated above, *OmniClass* follows ISO 12006-2. In an attempt to harmonize all definitions of all terms used with those addressed by that standard, many definitions are drawn from that standard. Terms in ***italics*** are directly related to *OmniClass* Table titles.

Built Environment: The whole of human construction.

Construction Agent: Human construction resource.

Construction Aid: See **Tool**.

Construction Complex: Two or more adjacent construction entities collectively serving one or more user activity or function.

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

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

Construction Entity: Independent material construction result of significant scale serving at least one user activity or function.

Construction Object: Not insignificant object serving some role in the construction industry; a subject for *OmniClass* classification.

Construction Process: Process which transforms construction resources into 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.

Designed Element:: An Element for which the work results have been defined. See also **Element**, **Products**, **Work Results**

Discipline: Practice area or specialty of the actors (participants) that carry out the processes and procedures that occur during the life cycle of a construction entity.

Element: A major component, assembly, or *"construction entity part which, in itself or in combination with other parts, fulfills a predominating function of the construction entity"* (ISO 12006-2). 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. See also **Designed Element**

Facet: Used in classification to mean one or another view of a topic. "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 Process: Construction process with the purpose of planning, administrating or assessing.

Materials: Substances used in construction or to manufacture products and other items used in construction. These substances may be raw materials or refined compounds.

Object: Any part of the perceivable or conceivable world. Objects may be material (e.g. engine) or immaterial (e.g. magnetism). [ISO 1087 - 1990] See also **Construction Object**.

Organizational Roles: The functional 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: A portion of work that arises from sequencing work in accordance with a predetermined portion of a Stage.

Process Aids: See **Tools**.

Products: Components or assemblies of components for permanent incorporation into construction entities. Products used temporarily during the design, construction, or maintenance of a project are called **Tools**.

Project Stage or Project Phase: (Refer to Stage and Phase in these Definitions.)

Properties: Characteristics of construction entities. Property definitions do not have any real meaning out of context -- without reference to one or more construction entities.

Services: The activities, processes and procedures 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: Three dimensional, material construction results contained within, or otherwise associated with, a building or other construction entity. A space may be bounded 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 function.

Stage: A categorization of the principal segments of a project. Stages usually are: Conception, Project Delivery Selection, Design, Construction Documents, Procurement, Execution, Utilization, and Closure.

Structure: See **Construction Entity**.

***Tools*:** 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.

Work Process: Predominant construction process which results in a work result.

Work Results: Construction results achieved in the production stage or phase 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 of work which is the result.

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- ARCOM Master Systems
- ASTM International (E06.25 and E06.81)
- Autodesk, Inc.
- Biblioteca Inc.
- BRW Architects, Inc.
- Building Systems Design, Inc.
- Buildscape, Inc.
- Callison Architecture, Inc.
- Carter & Burgess, Inc.
- CH2MHill
- Construction Specifications Canada (CSC)
- Construction Specifications Institute (CSI)
- Coperon Technologies
- Cromwell Architects Engineers, Inc.
- Databuilt.com
- Design Collective, Inc.
- Digicon Information Inc.
- DMJMH+N
- Door and Hardware Institute (DHI)
- Douglas Hardie Architect, Inc.
- eBuild (*a subsidiary of Hanley-Wood, LLC*)
- Electronic Commerce Code Management Association
- Ellermann + Schick Architects
- FKP Architects, Inc.
- Focus Collaborative, Inc.
- GB Consulting
- Georgia Institute of Technology
- Hall Architects, Inc.
- Hanscomb, Inc.
- HDR Inc.
- IBI Group Architects
- Independent Project Analysis, Inc.
- Infoconstruction.com
- International Alliance for Interoperability (IAI)
- International Centre for Facilities
- International Code Council (ICC)
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- Reed Construction Data
- RSMeans
- Saunders Evans Architects Inc.
- Schuyler Controls Inc.
- Specifications Consultants in Independent Practice (SCIP)
- Steel Truss and Component Association (STCA)
- TD Squared
- The Blue Book of Building and Construction
- The Cohos Evamy Partners
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Membership in the Committee is voluntary and open to all, and cost of participation is supported entirely by the individual members and their organizations. The OCCS Development Committee is glad to receive feedback on the implementation and use of *OmniClass*. Please send queries and comments directly to:

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