Designation: E3008/E3008M – 16ε1

Standard Classification for Transportation Surface Elements—UNIFORMAT II[1]

This standard is issued under the fixed designation E3008/E3008M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

ε[1] NOTE—Adjunct title and stock number in 2.3 were updated editorially in May 2020.

1. Scope

1.1 This standard establishes a classification of transportation surface elements within the UNIFORMAT II family of elemental classifications. It covers the full breadth of vehicular transportation surfaces, from rural roads to multi-lane interstate highways.

1.2 UNIFORMAT II classifications have an elemental format similar to the original UNIFORMAT[2] building elemental classification. However, the title UNIFORMAT II differs from the original in that it now takes into consideration a wide range of constructed entities that collectively form the built environment.

1.3 Elements, as defined here and in Classifications E1557 and E2103/E2103M, are major physical components that are common within constructed entities. Elements perform their given function(s), regardless of the design specification, construction method, or materials used.

1.4 This elemental classification serves as a consistent reference for analysis, evaluation, and monitoring during the feasibility, planning, and design stages when constructing transportation surfaces.

1.5 Using UNIFORMAT II elemental classifications ensures a consistency in the economic evaluation of construction projects over time and from project to project.

1.6 UNIFORMAT II classifications also enhance reporting at all stages of a constructed entity's life cycle—from feasibility and planning through the preparation of working documents, construction, maintenance, rehabilitation, and disposal.

1.7 This classification is unsuitable for process applications or for preparing trade estimates.

1.8 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

1.9 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.10 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[3]

E631 Terminology of Building Constructions
E833 Terminology of Building Economics
E917 Practice for Measuring Life-Cycle Costs of Buildings and Building Systems
E964 Practice for Measuring Benefit-to-Cost and Savings-to-Investment Ratios for Buildings and Building Systems
E1057 Practice for Measuring Internal Rate of Return and Adjusted Internal Rate of Return for Investments in Buildings and Building Systems
E1074 Practice for Measuring Net Benefits and Net Savings for Investments in Buildings and Building Systems
E1121 Practice for Measuring Payback for Investments in Buildings and Building Systems
E1185 Guide for Selecting Economic Methods for Evaluating Investments in Buildings and Building Systems
E1369 Guide for Selecting Techniques for Treating Uncertainty and Risk in the Economic Evaluation of Buildings and Building Systems
E1699 Practice for Performing Value Engineering (VE)/

[1] This classification is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.81 on Building Economics.

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[2] The original UNIFORMAT classification was developed jointly by the General Services Administration (GSA) and the American Institute of Architects (AIA).

[3] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

Value Analysis (VA) of Projects, Products and Processes
E1804 Practice for Performing and Reporting Cost Analysis During the Design Phase of a Project
E1946 Practice for Measuring Cost Risk of Buildings and Building Systems and Other Constructed Projects
E2013 Practice for Constructing FAST Diagrams and Performing Function Analysis During Value Analysis Study
E2506 Guide for Developing a Cost-Effective Risk Mitigation Plan for New and Existing Constructed Facilities
E2691 Practice for Job Productivity Measurement

2.2 *ASTM UNIFORMAT II Classification Standards Family:*[3]

E1557 Classification for Building Elements and Related Sitework—UNIFORMAT II
E2083 Classification for Building Construction Field Requirements, and Office Overhead & Profit
E2103/E2103M Classification for Bridge Elements—UNIFORMAT II
E2168 Classification for Allowance, Contingency, and Reserve Sums in Building Construction Estimating
E2514 Practice for Presentation Format of Elemental Cost Estimates, Summaries, and Analyses
E2516 Classification for Cost Estimate Classification System

2.3 *ASTM Adjunct:*[4]

Discount Factor Tables - Adjunct to E917 Practice for Measuring Life-Cycle Costs of Buildings and Building Systems - Includes Excel and PDF Files

3. Terminology

3.1 *Definitions*—For definitions of general terms related to building construction used in this classification, refer to Terminology E631, and for general terms related to building economics, refer to Terminology E833.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *element, n—in construction planning, design, specification, estimating, and cost analysis*, is a significant component part of the whole that performs a specific function, or functions, regardless of design, specification, or construction method.

3.2.2 *group element, n—in construction planning, design, specification, estimating, and cost analysis*, is a significant component part of the whole that includes relevant *elements* which, as a group, perform major specific function, or functions, regardless of design, specification, or construction method.

3.2.3 *major group element, n—in construction planning, design, specification, estimating, and cost analysis*, is a very significant component part of the whole that includes relevant *group elements* which, as a group, perform major specific function, or functions, regardless of design, specification, or construction method.

4. Significance and Use

4.1 This standard builds on the concepts and organizational framework established in Classification E1557. This classification describes transportation surface elements that are major components of most vehicular transportation surfaces. The elemental classification is the common thread linking activities and participants in a transportation surface project from initial planning through operations, maintenance, and disposal.

NOTE 1—As this classification refers solely to permanent, physical parts of any construction, two additional classifications, Classifications E2083 and E2168, need to be included when calculating construction cost. These standards provide for the inclusion of construction enabling, temporary, and risk mitigation cost figures. Procedures for reporting all these figures are described in Practices E1804 and E2514 and Classification E2516. While these three latter standards were primarily written for building construction, they are nonetheless appropriate and readily applied to other forms of construction as well.

4.2 The users of transportation surface UNIFORMAT II include:

4.2.1 *Financial and Investment*—Typically owners, developers, bankers, lenders, accountants, and financial managers.

4.2.2 *Implementation*—Primarily project managers; facilities programmers; designers, including engineers; and project controls specialists, including cost planners, estimators, schedulers, specification writers, and risk analysts.

4.2.3 *Facilities Management*—Comprising property portfolio managers, operating staff, and maintenance staff.

4.2.4 *Others*—Public officials, manufacturers, educators, students, and other project stakeholders.

4.3 *Apply This Classification When Undertaking the Following Work on Transportation Surface Projects:*[5]

4.3.1 *Financing and Investing:*

4.3.1.1 Structuring costs on an elemental basis for economic evaluations (Guide E1185 and Practices E917, E964, E1057, E1074, E1121, and E1804) early in the design process helps reduce the cost of early financial analysis and can contribute to substantial design and operational savings before decisions have been made that limit options for potential savings.

4.3.2 *Implementing:*

4.3.2.1 *Cost Modeling, Cost Planning, Estimating and Controlling Project Time and Cost During Planning, Design, and Construction*—Use the transportation surface UNIFORMAT II classification to prepare budgets and to establish elemental cost plans before design begins. Project managers and project controls specialists use these cost plans against which to measure and control project cost, and quality, and to set design-to-cost targets.

4.3.2.2 *Conducting Value Engineering Workshops*—Conducting value engineering workshops (Practices E1699 and E2013). Use this classification as a checklist to ensure that alternatives for all elements of significant cost in the transportation surface project are analyzed in the creativity phase of the

[4] Available from ASTM International Headquarters. Order Adjunct No. ADJE091717-EA. Original adjunct produced in 1984. Adjunct last revised in 2003.

[5] For a more comprehensive discussion of the uses of UNIFORMAT II, see Bowen, Charette, and Marshall, UNIFORMAT II—A Recommended Classification for Building Elements and Related Sitework, National Institute of Standards and Technology, Special Publication 841, Gaithersburg, MD, 1992; Charette and Marshall, UNIFORMAT II Elemental Classification for Building Specifications, Cost Estimating, and Cost Analysis, National Institute of Standards and Technology, NISTIR 6389, Gaithersburg, MD, 1999; and Kasi and Chapman, Benefits of Using ASTM Building Economics Standards for the Design, Construction, and Operation of Constructed Facilities, National Institute of Standards and Technology, Special Publication 1098, Gaithersburg, MD, 2012.

job plan. Also, use the elemental cost data to expedite the development of cost models for transportation surface systems.

4.3.2.3 *Developing Initial Project Master Schedules*—Since projects are essentially built element by element, UNIFORMAT II classifications are an appropriate basis for preparing construction schedules at the start of the design process. Project managers and project controls specialists use these time plans against which to measure and control project time (Practice E2691), and to set milestone target dates.

4.3.2.4 *Performing Risk Analyses*—Simulation (Guides E1369 and E2506) is one technique for developing probability distributions of transportation surface costs when evaluating the economic risk in undertaking a transportation surface project. Use individual elements and group elements in this classification for developing probability distributions of elemental costs. From these distributions, build up probability distributions of total costs to establish project contingencies (Practice E1946 and Classification E2168) or to serve as inputs to an economic analysis.

4.3.2.5 *Structuring Preliminary Project Descriptions During the Conceptual Design Phase*—This classification facilitates the description of the scope of the project in a clear, concise, and logical sequence for presentation to the client; it provides the basis for the preparation of more detailed elemental estimates during the early concept and preliminary design phases, and it enhances communication between designers and clients by providing a clear statement of the designer's intent.

4.3.2.6 *Coding and Referencing Standard Details in Computer-Aided Design Systems*—This classification allows a designer, for example, to reference an assembly according to this classification's element designations and build up a database of standard details. This is particularly appropriate to design modeling and building information modeling (BIM) applications.

4.3.3 *Managing Facilities:*

4.3.3.1 Recording and writing property condition assessment reports in a structured way, using UNIFORMAT II classifications, provides for a consistent, accessible, and searchable database of real property inventory.

4.3.4 *Other Activities:*

4.3.4.1 Structuring cost manuals and recording construction, operating, and maintenance costs in a computer database. Having a cost manual or computer database in an elemental format assists the preparation of an economic analysis early in the design stage and at a reasonable cost.

5. Basis of Classification

5.1 The framework in Fig. 1 shows the various constructed entities that collectively are used to create the built environment. Each entity is treated as a module. Appropriate modules used together will effectively describe any planned or built development. This standard classification describes exclusively the elements that make up one of those constructed entities, transportation surface, shown as the shaded block under the heading of Heavy (Civil) Entities.

5.1.1 This transportation surface classification is applicable to the full breadth of vehicular transportation surfaces. The classification includes unpaved roads, paved roads, and divided highways. The classification does not include the following types of transportation surfaces: driveways, railroads, and runways.

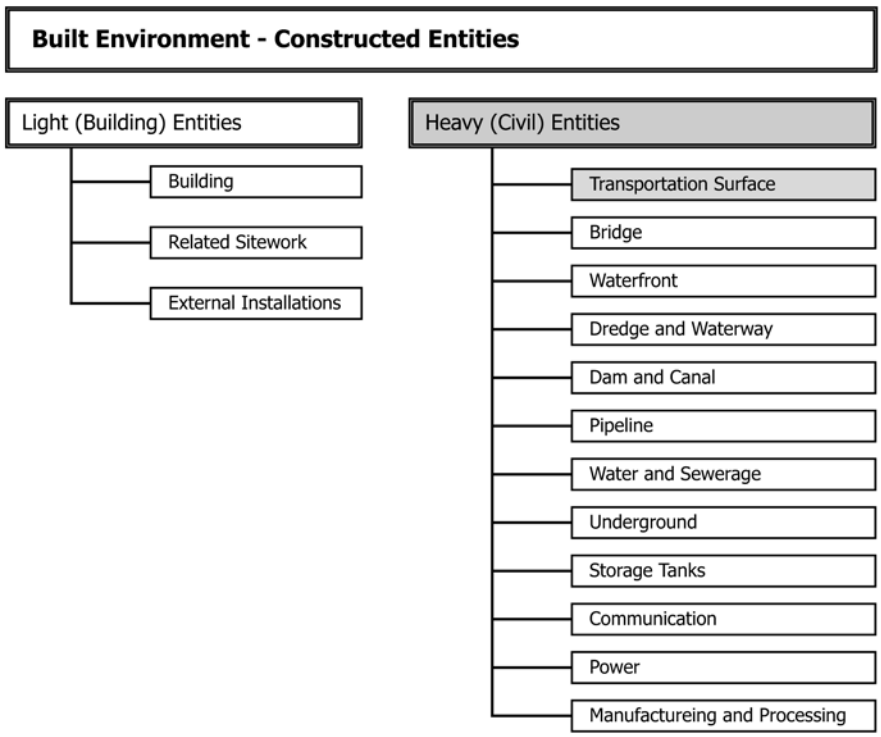

FIG. 1 List of Constructed Entities Suitable for Inclusion in the Family of UNIFORMAT II Elemental Classifications