



Standard Practice for Measuring Payback for Investments in Buildings and Building Systems¹

This standard is issued under the fixed designation E1121; 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.

1. Scope

1.1 This practice provides a recommended procedure for calculating and applying the payback method in evaluating building designs and building systems.

2. Referenced Documents

2.1 ASTM Standards:²

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

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

2.2 Adjuncts:

Discount Factor Tables Adjunct to Practices E917, E964, E1057, E1074, and E1121³

3. Terminology

3.1 *Definitions*—For definitions of general terms related to building construction used in this practice, refer to Terminol-

ogy **E631**; and for general terms related to building economics, refer to Terminology **E833**.

4. Summary of Practice

4.1 This practice is organized as follows:

4.1.1 *Section 2, Referenced Documents*—Lists ASTM standards and adjuncts referenced in this practice.

4.1.2 *Section 3, Definitions*—Addresses definitions of terms used in this practice.

4.1.3 *Section 4, Summary of Practice*—Outlines the contents of the practice.

4.1.4 *Section 5, Significance and Use*—Explains the significance and use of this practice.

4.1.5 *Section 6, Procedures*—Describes step-by-step the procedures for making economic evaluations of buildings.

4.1.6 *Section 7, Objectives, Alternatives, and Constraints*—Identifies and gives examples of objectives, alternatives, and constraints for a payback evaluation.

4.1.7 *Section 8, Data and Assumptions*—Identifies data needed and assumptions that may be required in a payback evaluation.

4.1.8 *Section 9, Compute Payback Period*—Presents alternative approaches for finding the payback period.

4.1.9 *Section 10, Applications*—Explains the circumstances for which the payback method is appropriate.

4.1.10 *Section 11, Limitations*—Discusses the limitations of the payback method.

5. Significance and Use

5.1 The payback method is part of a family of economic evaluation methods that provide measures of economic performance of an investment. Included in this family of evaluation methods are life-cycle costing, benefit-to-cost and savings-to-investment ratios, net benefits, and internal rates of return.

5.2 The payback method accounts for all monetary values associated with an investment up to the time at which cumulative net benefits, discounted to present value, just pay off initial investment costs.

5.3 Use the method to find if a project recovers its investment cost and other accrued costs within its service life or within a specified maximum acceptable payback period (MAPP) less than its service life. It is important to note that the

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

Current edition approved Oct. 1, 2015. Published October 2015. Originally approved in 1986. Last previous edition approved in 2012 as E1121 – 12. DOI: 10.1520/E1121-15.

² 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.

³ Available from ASTM International Headquarters. Order Adjunct No. **ADJE091703**.