



Standard Classification for Serviceability of an Office Facility for Management of Operations and Maintenance^{1,2}

This standard is issued under the fixed designation E 1670; 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 classification contains pairs of scales for classifying an aspect of the serviceability of an office facility, that is, the capability of an office facility to meet certain possible requirements for operations and maintenance.

1.2 Within that aspect of serviceability, each pair of scales, shown in Figs. 1-4, are for classifying one topic of serviceability. Each paragraph in an Occupant Requirement Scale (see Figs. 1-4) summarizes one level of serviceability on that topic, which occupants might require. The matching entry in the Facility Rating Scale (see Figs. 1-4) is a translation of the requirement into a description of certain features of a facility which, taken in combination, indicate that the facility is likely to meet that level of required serviceability.

1.3 The entries in the Facility Rating Scale (see Figs. 1-4) are indicative and not comprehensive. They are for quick scanning and rating a facility and not for evaluating or diagnosing it.

1.4 This classification can be used to estimate the level of serviceability of an existing facility. It can also be used to estimate the serviceability of a facility that has been planned but not yet built, such as one for which single-line drawings and outline specifications have been prepared.

1.5 This classification indicates what would cause a facility to be rated at a certain level of serviceability but does not state how to conduct a serviceability rating nor how to assign a serviceability score. That information is found in Practice E 1334. The scales in this classification are complimentary to and compatible with Practice E 1334. Each requires the other.

¹ This classification is under the jurisdiction of ASTM Committee E-6 on Performance of Buildings and is the direct responsibility of Subcommittee E06.25 on Whole Buildings and Facilities.

Current edition approved April 15, 1995. Published July 1995. Originally published as E 1670 – 95. Last previous edition E 1670 – 95.

² Portions of this document are based on material originally prepared by the International Centre for Facilities (ICF) and © 1993 by ICF and Minister of Public Works and Government Services Canada. Their cooperation in the development of this standard is acknowledged.

2. Referenced Documents

2.1 ASTM Standards:

E 631 Terminology of Building Constructions³

E 1334 Practice for Rating Serviceability of a Building or Building-Related Facility³

E 1679 Practice for Setting Requirements for Serviceability of a Building or Building-Related Facility³

2.2 ISO Document:⁴

ISO 6240 International Standard, Performance Standards in Building—Contents and Presentation

3. Terminology

3.1 Definitions:

3.1.1 *facility*—a physical setting used to serve a specific purpose.

3.1.1.1 *Discussion*—A facility may be within a building, a whole building, or a building with its site and surrounding environment; or it may be a construction that is not a building. The term encompasses both the physical object and its use (see Terminology E 631).

3.1.2 *facility serviceability*—the capability of a facility to perform the function(s) for which it is designed, used, or required to be used.

3.1.2.1 *Discussion*—The scope of this performance is of the facility as a system, including its subsystems, components and materials and their interactions, such as acoustical, hydrothermal, air purity, and economic; and of the relative importance of each performance requirement (see Terminology E 631).

3.1.3 *office*—a place, such as a room, suite, or building, in which business, clerical or professional activities are conducted (see Terminology E 631).

3.1.4 For standard definitions of additional terms applicable to this classification, see Terminology E 631.

³ *Annual Book of ASTM Standards*, Vol 04.11.

⁴ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

4. Significance and Use

4.1 Each Facility Rating Scale (see Figs. 1-4) in this classification provides a means to estimate the level of serviceability of a building or facility for one topic of serviceability and to compare that level against the level of any other building or facility.

4.2 This classification can be used for comparing how well different buildings or facilities meet a particular requirement for serviceability. It is applicable despite differences such as location, structure, mechanical systems, age, and building shape.

4.3 This classification can be used to estimate the following:

4.3.1 Serviceability of an existing facility for uses other than its present use.

4.3.2 Serviceability (potential) of a facility that has been planned but not yet built.

4.3.3 Serviceability (potential) of a facility for which re-modeling has been planned.

4.4 Use of this classification does not result in building evaluation or diagnosis. Building evaluation or diagnosis generally requires a special expertise in building engineering or technology and the use of instruments, tools, or measurements.

4.5 This classification applies only to facilities that are building constructions, or parts thereof. (While this classification may be useful in rating the serviceability of facilities that are not building constructions, such facilities are outside the scope of this classification.)

4.6 This classification is not intended for, and is not suitable for, use for regulatory purposes, nor for fire hazard assessment nor for fire risk assessment.

5. Basis of Classification

5.1 The scales in Figs. 1-4 contain the basis for classification.

5.2 Instructions for the use of this classification are contained in Practices E 1334 and E 1679.

6. Keywords

6.1 building; competences; data base; facility; facility occupants; function; maintenance; management; occupant satisfaction; office; operations; outsourcing contractors; performance; rating; rating scale; requirements; serviceability; training; unit costs

B.3. Management of Operations and Maintenance

Scale B.3.1. Strategy and program for operations and maintenance

Facility Management Requirement Scale	Facility Rating Scale
9 ☐ ○ LEVEL OF MAINTENANCE AND OPERATION: Require buildings to be maintained and operated at a high level, helping occupants to be fully productive within their work environment. ○ TOLERANCE FOR OCCUPANT LOSS OF PRODUCTIVITY: Any loss of productivity due to breakdown of building services cannot be tolerated. ○ AVAILABILITY OF SUPPORT SERVICES: Need highly organized and responsive support service available to supplement in-house staff. 8 ☐ 7 ☐ ○ LEVEL OF MAINTENANCE AND OPERATION: Require buildings to be operated and maintained at a higher than average level. ○ TOLERANCE FOR OCCUPANT LOSS OF PRODUCTIVITY: Breakdowns must be rare, having negligible effect on productivity, and be repaired in hours, not days. ○ AVAILABILITY OF SUPPORT SERVICES: Require readily available outside support services to support in-house maintenance staff. 6 ☐ 5 ☐ ○ LEVEL OF MAINTENANCE AND OPERATION: Require buildings to be operated and maintained in a manner acceptable to the typical occupant in that locality. ○ TOLERANCE FOR OCCUPANT LOSS OF PRODUCTIVITY: Breakdown of building services can be tolerated if rarely occurring, having minor effect on productivity, causing only minimal disruption, and requiring same-day repair. ○ AVAILABILITY OF SUPPORT SERVICES: Require support services to be available. 4 ☐	9 ☐ ○ Strategy and program: Clearly documented O&M strategy to go beyond simple maintenance to make the building(s) as comfortable and flexible as is cost-effective in response to changing occupant needs, e.g. cooling, ventilating and power. Explicit objectives and criteria are adopted for performance measurement. ○ Adequacy of budget: Budget is appropriate to carry out strategy and program. ○ Human resources: One maintenance person per 40,000 gross sq ft. About 25% of their time is spent on preventative maintenance. ○ Availability of replacement parts: All parts are readily available on site. maintenance contractors: Outside resources are readily available and retained by firm contractual agreements. 7 ☐ ○ Strategy and program: Well documented O&M strategy to go beyond simple maintenance to make the building(s) as comfortable and flexible within set-point ranges optimized for operating economy. Some objectives and criteria for performance measurement. ○ Adequacy of budget: Budget is lean, but adequate to carry out strategy and program. ○ Human resources: One maintenance person per 50,000 gross sq ft. About 25% of their time is spent on preventative maintenance. ○ Availability of replacement parts: Critical and routine maintenance parts are readily available on-site. maintenance contractors: With some exceptions, outside support services are under firm contract. 6 ☐ 5 ☐ ○ Strategy and program: Brief written O&M strategy for responding to changing occupant needs, e.g. cooling, ventilating and power. ○ Adequacy of budget: Budget is tight, barely sufficient for carrying out strategy and program. ○ Human resources: One maintenance person per 75,000 gross sq ft. Preventative maintenance budget is less than 10% of total maintenance budget. ○ Availability of replacement parts: Ample supply of critical repair parts is available. Non-critical parts are available through alternative sources, usually within 24 hours. ○ Maintenance contractors: In-hours staff only adequate for basic maintenance and tasks requiring basic skills. Contractors provide maintenance requiring specialized skills, and extra staff at peak workload times. 4 ☐

Scale B.3.1. continued on next page

FIG. 1 Scale B.3.1 for Strategy and Program for Operations and Maintenance

B.3. Management of Operations and Maintenance

**Scale B.3. 1. Strategy and program for operations and maintenance
(continued)**

Facility Management Requirement Scale		Facility Rating Scale
3 ○ LEVEL OF MAINTENANCE AND OPERATION: Require minimal operation and maintenance. ○ TOLERANCE FOR OCCUPANT LOSS OF PRODUCTIVITY: Even lengthy or disruptive breakdown need not be costly for the organization.	2	3 ○ <u>Strategy and program</u>: Strategy is to be seen to answer complaints, but actually do minimum to get by. ○ <u>Adequacy of budget</u>: Budget is not adequate for a basic but effective O&M program. ○ <u>Human resources</u>: One maintenance person per 100,000 or more gross sq ft. No separate budget for preventative maintenance. ○ <u>Availability of replacement parts</u>: Few repair parts available. Critical parts usually available within 48 hours. ○ <u>Maintenance contractors</u>: Repair of breakdowns is staff's primary responsibility. Some service companies are under contract.
1 ○ LEVEL OF MAINTENANCE AND OPERATION: Very few occupants. ○ TOLERANCE FOR OCCUPANT LOSS OF PRODUCTIVITY: Little consequence if frequent or major disruptions.		1 ○ <u>Strategy and program</u>: No O&M strategy or program for responding to occupant complaints. ○ <u>Adequacy of budget</u>: O&M budget is negligible and does not permit an organized or planned O&M program. ○ <u>Human resources</u>: No maintenance staff. ○ <u>Availability of replacement parts</u>: No repair parts available on-site. Critical parts usually available within 48 hours. ○ <u>Maintenance contractors</u>: No firm contracts exist with outside contractors.

☐ Exceptionally important.
 ☐ Important.
 ☐ Minor Importance.

Minimum Threshold level =
 ☐ NA
 ☐ NR
 ☐ Zero
 ☐ DP

NOTES Space for handwritten notes on Requirements or Ratings

FIG. 1 Scale B.3.1 for Strategy and Program for Operations and Maintenance (continued)

B.3. Management of Operations and Maintenance

Scale B.3.2. Competences of in-house staff

Facility Management Requirement Scale	Facility Rating Scale
9 ☐ ○ REQUIRED LEVEL OF TRAINING AND SKILLS: Require training and skill levels suitable for highly cost-effective and highly reliable operations and maintenance.	9 ☐ ○ Training: Staff are very knowledgeable about current trade practices and changes in relevant codes, as indicated by productive relations with trade suppliers and by reference, when needed for the job, to latest editions of codes and interim updates. Own staff can cover a wider range of O&M tasks than available from outside contractors within one-hour driving distance. ○ Cross-trade qualifications: Staff able to rotate assignments between buildings and roles within a team without notice. ○ Electrical systems: Staff able to install home-run circuits for lighting and 110 and 3-phase power, open and close breakers, replace small breakers, isolate defective circuits in power panels using signal-generating device, trouble-shoot circuits using power analyzers. ○ Electronic systems and controls: Staff able to read ladder diagrams, use true RMS meters effectively, isolate and jump-start troubled circuits. ○ HVAC equipment: Staff able to take primary readings, e.g. static pressure, cfm levels, visually trouble-shoot drive components and operation, balance air quantities and adjust thermal set-points. Able to start and stop equipment using direct digital controls. Certification in refrigerant recycling. ○ Piping systems and repair: Staff able to isolate damaged sections, make temporary and permanent repairs, and run new sections to points of use. ○ Minor carpentry: Staff able to make small cabinets, cut various stock materials to size, make crates.
7 ☐ ○ REQUIRED LEVEL OF TRAINING AND SKILLS: Require training and skill levels to be adequate for cost-effective and reliable operations and maintenance.	7 ☐ ○ Training: Staff are sufficiently knowledgeable about current trade practices and code changes, which are adequate for most routine O&M tasks. Only rely on outside contractors for certain specialist or journeyman level tasks. ○ Cross-trade qualifications: At least one-half of staff able to rotate assignments between buildings and roles within a team with little notice, and less than one shift of refresher training. ○ Electrical systems: Staff able to check home-run circuits for lighting and 110 and 3-phase power, open and close breakers, replace small breakers, test for defective circuits in power panels using signal-generating device, and trouble-shoot simple circuits using power analyzers. ○ Electronic systems and controls: Staff able to read simple ladder diagrams, work with true RMS meters, and isolate troubled circuits. ○ HVAC equipment: Staff able to take primary readings, e.g. static pressure, cfm levels, visually trouble-shoot drive components and operation, and adjust thermal set-points. Able to start and stop equipment using direct digital controls. ○ Piping systems and repair: Staff able to isolate damaged sections, make temporary repairs, and run new sections to points of use. ○ Minor carpentry: Staff able to cut various stock materials to size, and make crates.

Scale B.3.2. continued on next page

FIG. 2 Scale B.3.2 for Competences of In-house Staff

B.3. Management of Operations and Maintenance

Scale B.3.2. Competences of in-house staff (continued)

Facility Management Requirement Scale		Facility Rating Scale
5 ☐ REQUIRED LEVEL OF TRAINING AND SKILLS: Require training and skill levels of own staff to be adequate for basic operation. Outside contractors are required for repair and specialized maintenance.	4	5 ☐ Training: Staff know the limits of their skills and knowledge, which are adequate for simple and repetitive O&M tasks. Rely on outside contractors for journeyman level tasks. Cross-trade qualifications: At least one-quarter of staff able to rotate assignments between buildings and roles within a team, if there is at least one shift of refresher training. Electrical systems: Staff able to check home-run circuits for lighting and 110 and 3-phase power, open and close breakers, and test for defective circuits in power panels using signal-generating device. Electronic systems and controls: Staff able to read simple ladder diagrams, and isolate troubled circuits. HVAC equipment: Staff able to take primary readings, e.g. static pressure, cfm levels, visually trouble-shoot drive components and operation, and adjust thermal set-points. At least one person on each shift able to start and stop equipment using direct digital controls. Piping systems and repair: Staff able to isolate damaged sections, and make temporary repairs. Minor carpentry: Staff able to cut various stock materials to size, and make simple crates.
3 ☐ REQUIRED LEVEL OF TRAINING AND SKILLS: Do not require skilled operation. Equipment is no more complicated than that in an apartment building. Rely on outside contractors for any complex O&M task.	2	3 ☐ Training: Staff have limited skills and knowledge, adequate only for simple and repetitive O&M tasks. Rely on outside contractors for all skilled and specialized tasks. Cross-trade qualifications: Most staff not able to rotate assignments between buildings or roles within a team. Electrical systems: Staff able to check only simple circuits for lighting and 110 power, and to open and close breakers. Electronic systems and controls: Staff able to read simple ladder diagrams. HVAC equipment: Staff able to take primary readings, e.g. static pressure, cfm levels, and adjust thermal set-points. Piping systems and repair: Staff able to isolate damaged sections. Minor carpentry: Staff able to cut various stock materials to size.
1 ☐ REQUIRED LEVEL OF TRAINING AND SKILLS: Only require the low level of O&M capability typical of a resident in a single-family house in a large city.		1 ☐ Training: Staff have no skills or knowledge for O&M tasks. Rely on outside contractors for O&M. Cross-trade qualifications: No capability. Electrical systems: Staff only able to open and close breakers. Electronic systems and controls: No capability. Hvac equipment: Staff able to adjust thermal set-points. Piping systems and repair: No capability. Minor carpentry: No capability.

☐ Exceptionally important. ☐ Important. ☐ Minor Importance.

Minimum Threshold level = ☐ NA ☐ NR ☐ Zero ☐ DP

NOTES Space for handwritten notes on Requirements or Ratings

FIG. 2 Scale B.3.2 for Competences of In-house Staff (continued)

B.3. Management of Operations and Maintenance

Scale B.3.3. Occupant satisfaction

Facility Management Requirement Scale	Facility Rating Scale
9 ☐ ○ LEVEL OF SATISFACTION WITH O&M OPERATIONS: Most occupants, e.g. 85%, should be satisfied or very satisfied with O&M operations. Problem situations should be rare, and occupants should give facility managers the benefit of the doubt. ○ MANAGEMENT SUPPORT OF O&M OPERATIONS: O&M managers should have the full confidence of senior management, who should rarely if ever be involved with problems. Budgets should be fully adequate for the O&M strategy. ○ OUTSOURCING FOR O&M OPERATIONS: If work is by in-house staff, then outsourcing as a means of improving O&M performance should never be seriously considered. If outsourced, should have no reason to consider a change. 7 ☐ ○ LEVEL OF SATISFACTION WITH O&M OPERATIONS: At least two thirds of occupants should be satisfied or very satisfied with O&M operations. Problem situations should be uncommon, and when they do arise occupants should consider O&M staff to be effective. ○ MANAGEMENT SUPPORT OF O&M OPERATIONS: Senior management should generally accept the O&M strategy, and provide budgets adequate for it. ○ OUTSOURCING FOR O&M OPERATIONS: If work is by in-house staff, then outsourcing as a means of replacing O&M staff should never be seriously considered. If outsourced, then change should not be seriously considered.	9 ☐ ○ Actions to achieve confidence of occupant staff: When failure occurs, e.g. power outage, occupant staff are informed immediately of the cause, action being taken, and given an accurate estimate of time until restoration of service. Staff ask few questions and acknowledge the high effectiveness of O&M staff. ○ Actions to achieve confidence of senior management: Management understands cost and productivity consequences of O&M strategy, and strongly supports that strategy. Few complaints reach management. Overall indicator is that management strongly supports O&M staff and O&M budget, and provides funding to limits compatible with corporate context. ○ Response to surveys: Surveys of occupants are conducted at least annually (separately or as part of a corporate TQM program) and responses regarding O&M of facilities are consistently favourable (higher than 85% satisfied or very satisfied). ○ Outsourcing: Satisfaction with current operations is so high that alternative services, e.g. outsourcing, are not considered. 7 ☐ ○ Actions to achieve confidence of occupant staff: When failure occurs, e.g. power outage, occupant staff are informed promptly of the cause, action being taken, and likely time until restoration of service. Most staff acknowledge the effectiveness of O&M staff. ○ Actions to achieve confidence of senior management: Management is informed about cost and productivity consequences of O&M strategy, and supports that strategy. Overall indicator is that management supports O&M staff, generally supports O&M budget, and provides adequate funding within limits compatible with corporate context. ○ Response to surveys: Surveys of occupants are conducted at least annually (separately or as part of a corporate TQM program) and responses are consistently favourable (at least two thirds are satisfied or very satisfied). ○ Outsourcing: Satisfaction with current operations is good, so that alternative services, e.g. outsourcing, are not imposed.

Scale B.3.3. continued on next page

FIG. 3 Scale B.3.3 for Occupant Satisfaction

B.3. Management of Operations and Maintenance

Scale B.3.3. Occupant satisfaction (continued)

Facility Management Requirement Scale	Facility Rating Scale
5 ☐ ○ LEVEL OF SATISFACTION WITH O&M OPERATIONS: Occupants should generally accept the adequacy of O&M operations, and few should be dissatisfied. ○ MANAGEMENT SUPPORT OF O&M OPERATIONS: Senior management should generally support O&M staff, even though O&M operations may be subject to tight budget control and cost reduction programs. ○ OUTSOURCING FOR O&M OPERATIONS: Outsourcing should only be used when it is the best means of cost reduction. 4 ☐ 3 ☐ ○ LEVEL OF SATISFACTION WITH O&M OPERATIONS: It is not a problem if staff are dissatisfied with O&M operations, e.g. because the facilities will soon be disposed of. ○ MANAGEMENT SUPPORT OF O&M OPERATIONS: Senior management's support and adequate budgets for O&M are not considered significant in this organization. ○ OUTSOURCING FOR O&M OPERATIONS: Outsourcing is used or planned for a substantial portion of O&M work, e.g. at least one-quarter. 2 ☐ 1 ☐ ○ LEVEL OF SATISFACTION WITH O&M OPERATIONS: O&M for the organization's facilities are not considered important to the occupants. ○ MANAGEMENT SUPPORT OF O&M OPERATIONS: O&M for the organization's facilities are not considered important to the management. ○ OUTSOURCING FOR O&M OPERATIONS: All or a majority of O&M is or will be outsourced. 1 ☐	5 ☐ ○ Actions to achieve confidence of occupant staff: When failure occurs, e.g. power outage, occupant staff are informed of likely time until restoration of service, and information is approximately correct more than half the time. Some occupant staff acknowledge the effectiveness of O&M staff. ○ Actions to achieve confidence of senior management: Management is informed of O&M strategy for responding to changing occupant needs, and has not rejected it. Overall indicator is that management supports O&M staff, and accepts basic O&M budget subject to tight controls. ○ Response to surveys: There is no formal process or surveys for obtaining information about occupant satisfaction. Informal or ad hoc indicators suggest that at least one-half of occupants are satisfied or very satisfied, and less than 10% are very dissatisfied. ○ Outsourcing: Satisfaction with current operations is sufficient that alternative services, e.g. outsourcing, are used or planned for less than one-quarter of O&M budget. 3 ☐ 3 ☐ ○ Actions to achieve confidence of occupant staff: When failure, occurs, e.g. power outage, occupant staff are sometimes informed of likely time until restoration of service, but information is often not correct. Many occupant staff consider that O&M staff are not effective. ○ Actions to achieve confidence of senior management: Management is not aware of an O&M strategy for responding to changing occupant needs. Overall indicator is that basic O&M budget is subject to tight controls and cuts. ○ Response to surveys: There is no objective information about occupant satisfaction. Informal or ad hoc indicators suggest that up to one-half of occupants are satisfied, but more than one-tenth are dissatisfied and complaining. ○ Outsourcing: Alternative services, e.g. outsourcing, are used or planned for more than one-quarter of O&M budget. 1 ☐ 1 ☐ ○ Actions to achieve confidence of occupant staff: When failure occurs, e.g. power outage, occupant staff consider O&M staff to be ineffectual, have no confidence in the information O&M staff provide, and seek outside service or support. ○ Actions to achieve confidence of senior management: There is no person on staff to whom management has delegated authority or a budget for O&M. ○ Response to surveys: There are objective indicators of strong occupant dissatisfaction. Many occupants complain often. ○ Outsourcing: Alternative services, e.g. outsourcing, are used or planned for more than one-half of O&M budget. 1 ☐

☐ Exceptionally important. ☐ Important. ☐ Minor Importance.

Minimum Threshold level =

☐ NA ☐ NR ☐ Zero ☐ DP

NOTES Space for handwritten notes on Requirements or Ratings

FIG. 3 Scale B.3.3 for Occupant Satisfaction (continued)

B.3. Management of Operations and Maintenance

Scale B.3.4. Information on unit costs and consumption

Facility Management Requirement Scale	Facility Rating Scale
9 ☐ ○ O&M STAFF UNDERSTANDING OF PRACTICES AND COSTS: Essential that O&M staff have an excellent understanding of their building operational practices and setpoints and their associated costs and consumption of fuel, supplies and labour. ○ ANALYSIS AND CORRECTION: That these be well analyzed and benchmarked, using current and historical data. Essential that these analyses lead to action plans and to full and effective correction and followup. ○ COOPERATION OF BUILDING OCCUPANTS: Full cooperation of building occupants is required when achieving economies.	9 ☐ ○ <u>Database on O&M operations</u>: Data on power and fuel consumption and costs, and on O&M supplies, parts and labour is accurate and complete. Conveniently available data covers current year and three prior years, plus analyzed summaries for prior years; and detailed data for prior years is archived. Database is organized for convenience of current operations and for analysis by: occupant group; physical system; and building or building-related facility. Data on power and fuel includes: electrical submetering for lighting, convenience power, heating and cooling, reprographics, food service, and other; fuel consumptions; unit electrical and fuel costs. ○ <u>Comparison with recognized external standards and practices</u>: Data is assembled in appropriate units for external comparison, e.g. therms/ft², \$/m², person-hours/m² or /ft². Relevant comparative data is regularly obtained regarding best-in-class and typical, and from BOMA Experience Exchange Report or IFMA Benchmarks. ○ <u>Knowledge of building operational parameters and their associated costs</u>: Baseline costs are estimated from compliance with standards and operating targets, such as for comfort levels, power consumption and quality. Actual and baseline are reported and analyzed monthly. Weak or inefficient resources are identified and analyzed. ○ <u>Use of information for effective O&M operations</u>: Variance in current operations is analyzed, as are comparisons to external standards and practices. These analyses lead to appropriate action plans, and to prompt and effective corrective action and followup, e.g. in operating or maintenance practices; staffing levels, skills or training; or to set-points; or to collaboration with occupants; etc. Economies effected with full cooperation of building occupants.
7 ☐ ○ O&M STAFF UNDERSTANDING OF PRACTICES AND COSTS: Important that O&M staff have a good understanding of their building operational practices and setpoints and their associated costs and consumption of fuel, supplies and labour. ○ ANALYSIS AND CORRECTION: These be well analyzed and benchmarked. These analyses should lead to action plans and to prompt corrective action on priority items. ○ COOPERATION OF BUILDING OCCUPANTS: Cooperation of building occupants should be obtained when achieving economies.	7 ☐ ○ <u>Database on O&M operations</u>: Data on power and fuel consumption and costs, and on O&M supplies, parts and labour, is accurate and nearly complete. Conveniently available data covers current year and prior year, plus summaries for prior years; and detailed data for prior years is archived. Database is organized for convenience of current operations by: physical system; and building or building-related facility. Data on power and fuel includes: electrical submetering for lighting, convenience power, heating and cooling, food service, and other; fuel consumptions; unit electrical and fuel costs. ○ <u>Comparison with recognized external standards and practices</u>: Portions of the data are assembled in appropriate units for external comparison, e.g. \$/m² or /ft², person-hours/m² or /ft². Comparative data is obtained annually regarding typical and best in own industry, and from BOMA Experience Exchange Report or IFMA Benchmarks. ○ <u>Knowledge of building operational parameters and their associated costs</u>: Baseline costs are estimated from compliance with organization's operating targets. Actual and baseline are reported and analyzed monthly. Weak or inefficient resources are identified. ○ <u>Use of information for effective O&M operations</u>: Variance in current operations, and comparisons to external standards and practices, are analyzed. Priority items are selected for analyses leading to appropriate corrective action, e.g. in operating or maintenance practices; staffing levels, skills or training; adjusting set-points; in collaboration with occupants.

Scale B.3.4. continued on next page

FIG. 4 Scale B.3.4 for Information on Unit Costs and Consumption

B.3. Management of Operations and Maintenance

Scale B.3.4. Information on unit costs and consumption (continued)

Facility Management Requirement Scale		Facility Rating Scale
5 ☐ O&M STAFF UNDERSTANDING OF PRACTICES AND COSTS: O&M staff should be aware of costs and consumption of fuel, supplies and labour; and that these be comparable to buildings in that locality, or to the industry. O ANALYSIS AND CORRECTION: This should lead to review and prioritizing of required corrective action.	4	5 ☐ Database on O&M operations: Some data on power and fuel consumption and costs, and on O&M supplies, parts and labour is available and accurate, covering current year and some prior year data. Database is organized by: physical system, and building or building-related facility. Data on power and fuel includes: power, heating and cooling, food service, and other; fuel consumptions; unit electrical and fuel costs. Comparison with recognized external standards and practices: Data is in format from meters and supplier invoices. Comparative data is reviewed annually, e.g. from BOMA Experience Exchange Report or IFMA Benchmarks. Knowledge of building operational parameters and their associated costs: Baseline costs are estimated from compliance organization's operating targets. Actual costs and consumptions are reported and analyzed annually. Weak or inefficient resources are identified. Use of information for effective O&M operations: Changes in current operations are noted. Priority items are selected for review.
3 ☐ O ANALYSIS AND CORRECTION: O&M costs should be minimized, to well below what is typical for the locality or the industry. Staffing levels should be cut.	2	3 ☐ Database on O&M operations: Some current-year data on power and fuel consumption and costs exists on supplier invoices, but is not used by O&M staff. There is no submetering. Labour cost totals are provided by accounting department. Comparison with recognized external standards and practices: Comparative data is obtained less often than annually, e.g. from BOMA Experience Exchange Report or IFMA Benchmarks. Knowledge of building operational parameters and their associated costs: Baseline costs are not estimated. Actual costs and consumptions are not reported or analyzed (instead, rely on data from accounting department). Use of information for effective O&M operations: Some changes in current operations are noted.
1 ☐ O&M STAFF UNDERSTANDING OF PRACTICES AND COSTS: No need for an organized O&M operation. A reason might be that the facility will be abandoned in the immediate future.		1 ☐ Database on O&M operations: There is no database. Comparison with recognized external standards and practices: Comparative data is not obtained. Knowledge of building operational parameters and their associated costs: Baseline costs are not estimated. Actual costs and consumptions are not reported or analyzed. Use of information for effective O&M operations: There is no planned follow-through when O&M staff or occupants become aware of a problem. Only responses are Fix it now, or, Ignore it.

☐ Exceptionally important. ☐ Important. ☐ Minor Importance.

Minimum Threshold level = ☐ NA ☐ NR ☐ Zero ☐ DP

NOTES Space for handwritten notes on Requirements or Ratings

FIG. 4 Scale B.3.4 for Information on Unit Costs and Consumption (continued)

The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).