

NBS
PUBLICATIONS

A11102 340228

NAT'L INST OF STANDARDS & TECH R.I.C.



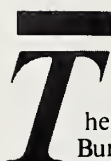
A11102340228

United States. Natlo/Bulding technology
QC100 .U57 V457-9:1985 C.1 NBS-PUB-C 197

1984 BUILDING TECHNOLOGY PUBLICATIONS

*U.S. Department of Commerce
National Bureau of Standards
Special Publication 457-9*

QC
100
.U57
457-9
1985
C. 2



The National Bureau of Standards¹ was established by an act of Congress on March 3, 1901. The Bureau's overall goal is to strengthen and advance the nation's science and technology and facilitate their effective application for public benefit. To this end, the Bureau conducts research and provides: (1) a basis for the nation's physical measurement system, (2) scientific and technological services for industry and government, (3) a technical basis for equity in trade, and (4) technical services to promote public safety. The Bureau's technical work is performed by the National Measurement Laboratory, the National Engineering Laboratory, the Institute for Computer Sciences and Technology, and the Institute for Materials Science and Engineering.

The National Measurement Laboratory

Provides the national system of physical and chemical measurement; coordinates the system with measurement systems of other nations and furnishes essential services leading to accurate and uniform physical and chemical measurement throughout the Nation's scientific community, industry, and commerce; provides advisory and research services to other Government agencies; conducts physical and chemical research; develops, produces, and distributes Standard Reference Materials; and provides calibration services. The Laboratory consists of the following centers:

- Basic Standards²
- Radiation Research
- Chemical Physics
- Analytical Chemistry

The National Engineering Laboratory

Provides technology and technical services to the public and private sectors to address national needs and to solve national problems; conducts research in engineering and applied science in support of these efforts; builds and maintains competence in the necessary disciplines required to carry out this research and technical service; develops engineering data and measurement capabilities; provides engineering measurement traceability services; develops test methods and proposes engineering standards and code changes; develops and proposes new engineering practices; and develops and improves mechanisms to transfer results of its research to the ultimate user. The Laboratory consists of the following centers:

- Applied Mathematics
- Electronics and Electrical Engineering²
- Manufacturing Engineering
- Building Technology
- Fire Research
- Chemical Engineering²

The Institute for Computer Sciences and Technology

Conducts research and provides scientific and technical services to aid Federal agencies in the selection, acquisition, application, and use of computer technology to improve effectiveness and economy in Government operations in accordance with Public Law 89-306 (40 U.S.C. 759), relevant Executive Orders, and other directives; carries out this mission by managing the Federal Information Processing Standards Program, developing Federal ADP standards guidelines, and managing Federal participation in ADP voluntary standardization activities; provides scientific and technological advisory services and assistance to Federal agencies; and provides the technical foundation for computer-related policies of the Federal Government. The Institute consists of the following centers:

- Programming Science and Technology
- Computer Systems Engineering

The Institute for Materials Science and Engineering

Conducts research and provides measurements, data, standards, reference materials, quantitative understanding and other technical information fundamental to the processing, structure, properties and performance of materials; addresses the scientific basis for new advanced materials technologies; plans research around cross-country scientific themes such as nondestructive evaluation and phase diagram development; oversees Bureau-wide technical programs in nuclear reactor radiation research and nondestructive evaluation; and broadly disseminates generic technical information resulting from its programs. The Institute consists of the following Divisions:

- Inorganic Materials
- Fracture and Deformation³
- Polymers
- Metallurgy
- Reactor Radiation

¹Headquarters and Laboratories at Gaithersburg, MD, unless otherwise noted; mailing address Gaithersburg, MD 20899.

²Some divisions within the center are located at Boulder, CO 80303.

³Located at Boulder, CO, with some elements at Gaithersburg, MD.

NBS Special Publication

NBS-6000.

QC

100

457

457-4

1985

2.2

BUILDING TECHNOLOGY PUBLICATIONS

Supplement 9: 1984

Linda Beavers, Editor

Center for Building Technology
National Engineering Laboratory
National Bureau of Standards
Gaithersburg, Md. 20899

August 1985



U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, Secretary
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, Director

National Bureau of Standards Special Publication 457-9
Natl. Bur. Stand. (U.S.) Spec. Publ. 457-9, 82 pages (August 1985)
CODEN: XNBSAV

U.S. GOVERNMENT PRINTING OFFICE
Washington: 1985

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, DC 20402

INTRODUCTION

This report is the ninth supplement to NBS Special Publication 457, Building Technology Publications, and lists the Center for Building Technology (CBT) documents published during 1984. It includes titles and abstracts of each NBS publication and each paper published in non-NBS media, key word and author indexes, and general information and instructions on how to order CBT publications.

This report communicates the results of CBT research to various technical audiences and to the general public. Publications constitute a major end product to CBT's efforts and, in 1984, appeared in several NBS publication series (Building Science Series, Technical Notes, Special Publications, NBS Interagency Reports, Grant/Contract Reports), and the media such as technical and trade publications. NBS publication series abbreviations are:

BSS – Building Science Series

TN – Technical Note

SP – Special Publication

NBSIR – National Bureau of Standards Interagency Report

GCR – Grant/Contract Report

This year's Building Technology Publications were extracted from the National Technical Information Service (NTIS) Bibliographic Data Base and are cited in NTIS format. It is divided into five sections. The first, *Reports Announcements* is bibliographic data and abstracts for NBS publications and papers published in outside sources. The *Author Index* cites each CBT author and gives the publication title, NTIS order number, and abstract number for those publications listed in the Reports Announcements section. The *Key Word Index* lists key words, publication title, NTIS order number, and abstract number for each publication and paper. The *NTIS Order/Report Number Index* lists the NBS report series number, NTIS order number, title, and abstract number. The *Title Index* lists the title, NTIS order number, and abstract number.

NBS undertakes research in various areas. Interested readers will find other NBS publications listed in NBS Special Publication 306-16, Publications of the National Bureau of Standards 1984, from which parts of this report have been taken.

OBTAINING PUBLICATIONS

Microfiche and paper copies of most CBT publications may be ordered through the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161. Two other sources are depository libraries (libraries designated to receive Government publications) and Department of Commerce District Offices. The current price list and availability of publications listed in this report are noted by the NTIS price code. This price code is found in the NTIS Order/Report Number Index section. The price code is designated by the designation PC (price code) followed by the cost code. MF (microfiche) has its price code noted below.

STANDARD PRICED DOCUMENTS AND MICROFICHE

Price Code	Page Range	Price
A01	Microfiche	\$ 9.00
A02	001-025	14.00
A03	026-050	17.00
A04	051-075	20.00
A05	076-100	23.00
A06	101-125	26.00
A07	126-150	29.00
A08	151-175	32.00
A09	176-200	35.00
A10	201-225	38.00
A11	226-250	41.00
A12	251-275	44.00
A13	276-300	47.00
A14	301-325	50.00
A15	326-350	53.00
A16	351-375	56.00
A17	376-400	59.00
A18	401-425	62.00
A19	426-450	65.00
A20	451-475	68.00
A21	476-500	71.00
A22	501-525	74.00
A23	526-550	77.00
A24	551-575	80.00
A25	576-600	83.00
A99	601&up	1/

1/ Add \$3.00 for each additional 25-page increment, or portion thereof.

The depository libraries listed in Appendix A receive selected publication series of the National Bureau of Standards for general reference use. While every Government publication cannot be sent to all depository libraries, certain designated Regional libraries are required to receive and retain one copy of all Government publications made available either in printed or microfiche form. To obtain information on which publications are available, please contact the depository library in your area.

Department of Commerce District Offices are maintained in the cities listed in Appendix B. Their purpose is to provide ready access at the local level to publications, statistical statements, and surveys. Each District Office serves as an official sales agency of the Superintendent of Documents, U.S. Government Printing Office. These offices make available for local purchase a wide range of Government publications. The reference library maintained by each District Office contains many Government and private publications, periodicals, directories, reports, and other reference materials.

CONTENTS

Report Announcements _____	1
Personal Author Index _____	15
Key Word Index _____	19
Title Index _____	25
NTIS Order/Report Number Index _____	29
Appendix A - Depository Libraries in the United States ____	33
Appendix B - District Offices of the U.S. Department of Commerce _____	67

REPORT ANNOUNCEMENTS

Report Announcements

400,001
PB84-221068 Not available NTIS
 National Bureau of Standards, Washington, DC.
Wind Loading and Strength of Cladding Glass.
 Final rept.,
 D. A. Reed, and E. Simiu. Apr 84, 15p
 See also PB83-214189.
 Pub. in Jnl. of Struct. Eng. 110, n4 p715-729 Apr 84.

Keywords: *Glass, *Loads(Forces), *Aerodynamics, *Wind pressure, *Cladding, Buildings, Probability theory, Windows, Failure, Reprints.

A procedure for investigating glass cladding behavior under arbitrary loads, including fluctuating wind loads, was presented. The procedure accounts for the fact that internal stresses are nonlinear functions of the external loads, that initial glass strengths are random functions of position and direction, and that the glass strength undergoes degradation under the action of external loads in accordance with basic fracture mechanics laws that reflect subcritical crack growth. Numerical examples were presented and corresponding probability distribution curves were calculated, indicating the probability of failure of a specified panel subjected to fluctuating wind loads and to 1-minute constant loads. These curves were used to illustrate a methodology for assessing current glass cladding design procedures. For the case considered in the paper it was found that procedures based on the transformation of the peak wind load averaged over 1-2 seconds into an equivalent 1-minute load appear to result in overly optimistic assessments of the probability of failure of glass cladding under wind loads. The work reported in the paper is part of an ongoing window cladding research program being conducted at the National Bureau of Standards.

400,002
PB84-221712 Not available NTIS
 National Bureau of Standards, Washington, DC.
Probabilistic Design of Cladding Glass Subjected to Wind Loads.
 Final rept.,
 E. Simiu, and D. A. Reed. 1983, 22p
 Pub. in Proceedings of International Conference on Application Statistics Probability Soil and Structural Engineering (4th), Florence, Italy, June 13-17, 1983, p1339-1360.

Keywords: *Glass, *Loads(Forces), *Aerodynamics, *Wind pressure, *Cladding, Buildings, Probability theory, Windows, Failure, Design criteria.

In the past decade significant advances have been made in the application of fracture mechanics concepts to the analysis of the strength of glass. To date, these advances have not been synthesized with current knowledge in the areas of extreme wind climatology and building aerodynamics. The objective of this paper is to describe a methodology based on such a synthesis that allows the development of risk-consistent design criteria for cladding glass applicable to buildings with known orientation for which the aerodynamic information is obtained in the wind tunnel. The paper is divided into four parts. The first part consists of introductory and background material, including definitions of basic terms and a brief description of the constituent elements of any procedure for the design of cladding glass. The second part presents a critique of current glass cladding design practice in the United States. The third and fourth parts describe, respectively, the proposed methodology and its fracture mechanics component.

400,003
PB85-145423 Not available NTIS
 National Bureau of Standards, Gaithersburg, MD.
Measurements of Sky Luminance, Sky Illuminance, and Horizontal Solar Radiation.
 Final rept.,
 S. Treado, and G. Gillette. 1983, 6p
 Pub. in Jnl. of the Illuminating Engineering Society 12, n3 p130-135 Apr 83.

Keywords: *Sky, *Luminance, *Illuminance, *Daylighting, District of Columbia, Solar radiation, Measurement, Reprints.

Initial findings are presented of a sky measurement program currently underway at the National Bureau of Standards. Correlations are discussed relating horizontal illuminance to horizontal solar radiation, and zenith luminance to solar altitude angles for a North American climate (Washington, D.C.). These are simplified empirical equations to a complex phenomenon, but should be acceptable for most practical daylighting applications where accuracy is needed only within + or - 15%. Measurements were made only in the Washington, D.C. area. Similar efforts need to be made for other North American localities to validate these relationships.

400,004
PB84-220771 **PC A04/MF A01**
 National Bureau of Standards (NEL), Washington, DC.
 Center for Building Technology.
Fastest-Mile Wind Speeds in Hurricane Alicia.
 Final rept.,
 R. D. Marshall. Jun 84, 71p NBS/TN-1197
 Also available from Supt. of Docs as SN003-003-02592-5.

Keywords: *Hurricanes, *Wind velocity, Velocity measurement, Boundary layer, Building codes, Structural engineering, Mexico Gulf, Texas Gulf Coast(United States), Hurricane Alicia, Galveston(Texas), Houston(Texas).

Surface wind speeds recorded during the passage of Hurricane Alicia through the Galveston-Houston area on August 18, 1983, are used to estimate the fastest-mile wind speeds at 10 m above ground in open terrain. The paper describes the relationships between wind speeds for various averaging times and the boundary-layer representations used in the transformation to fastest-mile speeds. These speeds are compared with wind speeds recommended for the design of buildings and other permanent structures. Errors inherent in the original wind speed records and in the transformations are estimated.

400,005
PB84-245745 **PC A04/MF A01**
 National Bureau of Standards (NEL), Washington, DC.
 Center for Building Technology.
NBS (National Bureau of Standards) Daylight Availability Database.
 S. Treado, G. Gillette, W. Remmert, and J. Bean. Jul 84, 55p NBSIR-84/2859
 Sponsored in part by Naval Civil Engineering Lab., Port Hueneme, CA., National Fenestration Council, Topeka, KS., Naval Facilities Engineering Command, Alexandria, VA., Directorate of Civil Engineering (Air Force), Washington, DC., and Office of Chief Engineers (Army), Washington, DC.

Keywords: *Daylight, *Irradiance, *Luminance, *Sky brightness, *Atmospheric temperature, *Buildings, Histograms, Availability, *Energy requirements.

This report presents an annual database containing hourly measurements of solar radiation, illumination, sky luminance, and ambient air temperature. The measurements were made at the National Bureau of Standards, Gaithersburg, Maryland. Both instantaneous hourly and integrated average hourly measurements are included, as are daily, monthly and annual average and totals. For each measured quantity, a histogram of the distribution of the data is presented for the year. The data measurement, collection, and analysis system is described. This type of information is useful for determining energy requirements of buildings.

400,006
PB85-143295 Not available NTIS
 National Bureau of Standards, Gaithersburg, MD.
Innovation in Residential Construction.
 Final rept.,
 F. T. Ventre. 1979, 10p
 Sponsored by Massachusetts Inst. of Tech., Cambridge.

Pub. in Technology Review 82, n2 p50-59 1979.

Keywords: *Buildings, *Construction industry, Management, Strategy, Regulations, Analyzing, Policies, Government policies, Reprints, *Technology innovation.

Conventional indirect measures of technological change in industry are shown to mislead analysts of the building industry. The result is a continuing popular and academic misreading of the industry. The diffusion of 14 innovations in the industry are measured empirically rather than inferentially and differences in diffusion rates are related to the industry's 'management' of those innovations. A joint public-private strategy for managing future innovations is suggested. A more detailed, technical version of this paper will appear in Volume 10 of Policy Sciences. The current version is intended for policy makers in industry and government.

400,007
PB85-121465 **PC A04/MF A01**
 National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities.
 W. D. Kovacs, E. V. Leyendecker, J. S. Leiss, and L. A. Lister. Jun 84, 52p NBSIR-84/2833
 Sponsored in part by Federal Energy Regulatory Commission, Washington, DC.

Keywords: *Liquefied natural gas, *Facilities, *Earthquake resistant structures, Reviewing, Data, Site surveys, Information, Requirements, Safety, Standards, *Certification, Applicants, Federal energy regulatory commission.

This report describes data needed by the Federal Energy Regulatory Commission for the seismic review of Liquefied Natural Gas (LNG) facilities and is intended to expedite the certification process of the Federal Energy Regulatory Commission. It uses a format familiar to those industry representatives and their consultants who work on siting other safety-related structures. Available state and Federal regulations were reviewed for format and type of information required to develop a source document which can be used to establish a consistent format and content for applications in their submittal of the necessary geological-structural-seismic information required to analyze sites for LNG facilities. Design criteria and levels of safety to be used in analyzing sites were not considered.

400,008
PB85-100410 **PC A06/MF A01**
 National Bureau of Standards (NEL), Washington, DC.
 Building Equipment Div.
Interim Design Guidelines for Automated Offices.
 A. I. Rubin. Aug 84, 117p NBSIR-84/2908
 Sponsored in part by Public Buildings Service, Washington, DC.

Keywords: *Office management, *Automation, Design criteria, Organization theory, Office equipment, Environmental engineering.

This report presents interim guidelines for the design of offices using automated technologies. The introduction of automated systems into offices has changed the office setting as a place to work. Architects and other design professionals have responded to this technology by formulating a variety of design strategies. This report identifies design issues which merit consideration in automated offices, tentative criteria for environments and systems based on an overview of all resources used to develop this document, and typical approaches used accomplish design goals. Technological, ergonomic and organizational factors are considered from the standpoint of design implications.

400,009
PB84-177823 PC A05/MF A01
National Bureau of Standards, Washington, DC. National Engineering Lab.
Role of Color in Lighting for Meat and Poultry Inspection.
B. L. Collins, and J. A. Worthey. Mar 84, 89p NBSIR-84-2829
Sponsored in part by Department of Agriculture, Washington, DC.

Keywords: *Food inspection, *Food analysis, *Meat, *Poultry, *Colors(Materials), *Chromaticity, Illuminescence, Inspection, Spectroradiometers, Reflectance, Light(Visible radiation), Luminous intensity.

The role of color in lighting for meat and poultry inspection is discussed. A review of literature relevant to the problem of quality of illumination is presented, along with literature specific to agricultural and veterinary problems. A psychophysical study of the accuracy of detecting and identifying selected defects in meat and poultry was conducted under five light sources: incandescent, cool white fluorescent, cool white deluxe, high pressure sodium (HPS), and low pressure sodium (LPS). The results indicated that more errors were made under the latter two sources, and that the inspection task was rated as more difficult under these sources. In addition, spectroradiometric measurements were made of defective and adjacent 'normal' tissue to document the kinds of spectral reflectance that exist in four species: chicken, cattle, turkey, and swine. These measurements indicated that differences in spectral reflectance characterized much of the tissue studied. Based on these data, recommendations are made to avoid the use of light sources with poor color rendering qualities in the inspection task.

400,010
PB85-138592 PC A04/MF A01
Cornell Univ., Ithaca, NY. School of Civil and Environmental Engineering.
Practical Approximations of Peak Wave Forces.
M. Grigoriu, and B. Alibe. Nov 84, 60p NBS/GCR-84/481
Sponsored in part by Minerals Management Service, Reston, VA.

Keywords: *Water waves, *Storms, Statistical analysis, Drag, Inertia, Force, Ocean waves, Approximation, Simulation, Peaks.

According to Morrison's equation, wave forces acting on cylindrical members have two components: drag forces, which depend nonlinearly on wave particle velocity, and inertia forces, which are proportional to wave particle acceleration. Wave forces are then non-Gaussian processes although fluid velocities are assumed to follow Gaussian distributions. This report develops approximations of the mean of the peak of wave forces during design storms. It shows that the square root of the sum of the squares (SRSS) rule can be applied to approximate the mean of the peak wave force from the average peaks of inertia and drag forces. The approximation is satisfactory for any ratio of drag to inertia forces and frequency content of the wave particle velocity process. The report also provides various descriptors of drag, inertia, and wave forces, including marginal distributions, mean crossing rates, and extreme value distributions.

400,011
PB84-165877 PC A09/MF A01
National Bureau of Standards, Washington, DC.
Use of Hazard Pictorials/Symbols in the Minerals Industry.
Open file rept. 30 Jan 81-31 Jan 83 (Final).
B. L. Collins. Sep 83, 194p NBSIR-83-2732,
BUMINE-OFR-44-84
Contract J01113020

Keywords: *Mining, *Safety engineering, *Symbols, Accident prevention, Hazards, Color codes, Responses, Human factors engineering, Guidelines, Handbooks, *Mine safety, *Mineral industries.

This report documents a multiphase research effort on the evaluation of the effectiveness of safety symbols and hazard pictorials for use in mining and milling operations. The first phase reviews applicable codes and standards, and documentation of typical mining hazards to determine relevant safety messages. In the

second phase, visits were made to eight mine sites to document existing sign practice and common mining hazards. In the third phase, the effectiveness of 2 sets of symbols for 40 different safety messages was evaluated with 267 miners from 10 sites at disparate geographical locations. The evaluation included an assessment of the effectiveness of six different symbol surround shapes and colors. The most effective symbols depicted both the person and the hazard or protective gear; these were more representational than highly abstract. Based on this research, a set of 40 symbols are suggested for further graphic refinement, additional evaluation, and eventual use.

400,012
PB85-137719 PC A04/MF A01
Maryland Univ., College Park. Dept. of Civil Engineering.
Size Effect in Simple Shear Testing.
M. I. Amer, M. S. Aggour, and W. D. Kovacs. Nov 84, 66p NBS/GCR-84/478
Prepared in cooperation with Rhode Island Univ., Kingston.

Keywords: *Soil mechanics, *Shear tests, Damping, Finite element analysis, Shear properties, Earthquake engineering.

Simple shear testing is considered to be one of the most appropriate ways of reproducing in the laboratory the stresses that would be experienced by an element of soil subjected to earthquake loading. The main drawback concerns the sample size, in that for a small sized sample, the test results are affected by the non-uniformity of the stress in the sample. To investigate the sample size effect on the primary dynamic soil properties, namely the shear modulus and damping, a large simple shear apparatus was constructed. A total of 144 tests were performed to study the size effect and to choose an ideal size for testing dry sand. The suggested size gave results of shear modulus and damping independent of the sample boundaries. Formulas and charts for correction factors were also developed to be used to correct the results from simple shear tests on samples having sizes other than the ideal size proposed herein.

400,013
PB84-217892 PC A04/MF A01
National Bureau of Standards (NEL), Washington, DC. Center for Building Technology.
Modular Data Acquisition and Display Software System for a Laboratory Environment.
Final rept.,
L. Kaetzel, J. Grimes, and P. Brown. May 84, 63p NBS/TN-1188
Also available from Supt. of Docs as SN003-003-02589-5. Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Laboratory equipment, Experimental data, Data acquisition, Data processing, Minicomputers, *Computer software, Multiprogramming, MADS system, Building materials, Phase change materials.

This report describes the processes involved in acquiring and analyzing experimental laboratory data using a medium sized computer in a multi-programming environment with a modular software system. Research involving Phase Change Materials and Calorimetric Performance measurements in building research are used as case studies to describe the functional capabilities and operational procedures of the system. The software system consists of computer programs which allow the researcher to collect, store, and analyze data graphically.

400,014
PB85-170587 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Civil Engineering Standards for the Computer Age.
Final rept.,
R. Wright. May 84, 1p
Pub. in Civil Engineering Magazine, 7p May 84.

Keywords: *Civil engineering, *Standards, Interfaces, Reprints, Computer applications, Expert systems.

As computer aids permeate civil engineering practice we may expect two major changes in civil engineering standards: expert computer systems will succeed printed paper as the medium for expression and use of standards, and new areas of standardization will promote the effectiveness, reliability and economy of computer aids. Civil engineers are alerted to opportunities and needs to participate in the evolution of civil engineering standards.

400,015
PB84-239334 Not available NTIS
National Bureau of Standards, Washington, DC.
Effects of Thermal Insulation Penetrating Electrical Boxes.
Final rept.,
J. R. Clifton, R. W. Beausoliel, and W. J. Meese. 1982, 21p
Pub. in American Society for Testing Materials 779, p241-261 1982.

Keywords: *Thermal insulation, *Electric outlets, *Switchgear, Hazards, Corrosion, Reprints.

When residential walls are retrofitted with 'foamed-in' urea-formaldehyde or 'blown-in' cellulose thermal insulations, the insulation may enter electrical outlet and switch boxes. The effects of these thermal insulations on electrical components such as outlet and switch boxes were studied.

400,016
PB84-154780 PC A04/MF A01
National Bureau of Standards, Washington, DC. National Engineering Lab.
Materials Research Activities at the National Bureau of Standards (1975-1982) Pertaining to Active Solar Heating and Cooling Systems.
C. W. C. Yancey. Nov 83, 75p NBSIR-83-2782
Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Solar heating, Thermal insulation, Heat storage, Materials, Heat transfer, Solar collectors, Working fluids, Solar cooling systems, Solar heating systems.

A summary of the solar energy materials-related research projects conducted by the National Bureau of Standards, for the U.S. Department of Energy, since 1975 is presented. Research studies concerned with materials that are utilized in the collector, transport and storage subsystems are summarized. Materials research areas covered by the documentation include: cover plates, absorber coatings, thermal insulation, sealants, containment materials, heat transfer fluids, hoses and storage media materials. The primary objectives, scope and principal results of the various studies are presented. The relationship between test results and subsequent consensus standard adoption or revision is drawn where applicable.

400,017
PB84-165299 PC A07/MF A01
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Mechanical Engineering.
Solar Collector Test Procedures: Development of a Method to Refer Measured Efficiencies to Standardized Test Conditions.
Final rept. 1977-80,
W. C. Thomas. Feb 84, 150p VPI-E-80-23, NBS-GCR-84-459
Grant NBS-G8-9022

Keywords: Tests, Efficiency, Performance tests, *Solar collectors.

An analytical procedure has been developed for referring collector efficiency measurements, obtained under different test conditions, to a common, or 'standard' set of conditions. The procedure applies to flat-plate liquid-type collectors of conventional tube-in-sheet design. The basic Hottel-Whillier-Bliss theory is used with appropriate extensions to account for serpentine flow configurations and glazing materials with

high infrared transmittance. The procedure includes a systematic method for deriving two invariant collector parameters directly from ASHRAE Standard 93-77 test results. The two parameters selected are the plate absorptance and back loss coefficient. A set of standard conditions is recommended which corresponds to favorable test conditions.

400,018
PB84-167675 PC A05/MF A01
 National Bureau of Standards, Washington, DC.
Demand Limiting Algorithms for Energy Management and Control Systems.
 C. Park. Feb 84, 89p NBSIR-84-2826
 Sponsored in part by Department of Energy, Washington, DC. Office of Building and Community Systems, and Civil Engineering Lab. (Navy), Port Hueneme, CA.

Keywords: *Electric power demand, Office buildings, Commercial buildings, Control equipment, Load control, Algorithms, Computer programs, *Energy management, Load management.

Demand limiting control is one of popular control strategies for electrical energy management in Energy Management and Control Systems (EMCS) in commercial/office buildings. The purpose of demand limiting is to maintain the peak demand level below a predetermined limit by shedding nonessential loads in a building during the peak demand period. In this present report, description of fixed interval metering and sliding window metering for electrical demands are included. Demand limiting calculation procedures discussed are the ideal rate, the predictive, and the instantaneous rate methods. Demand limiting algorithms, which were developed based on available information, are presented. Computer program listings of demand limiting control algorithms in Fortran 77 and an open-loop computer simulation result are included in the appendices.

400,019
PB85-108488 PC A03/MF A01
 National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Evaluation of Infrared Reflectance as a Technique for Measuring Absorber Materials Degradation,
 D. Waksman, and W. E. Roberts. Sep 84, 47p NBSIR-84/2916
 Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Antireflection coatings, Reflectance, Measurement, Degradation, Infrared spectra, *Solar absorbers, Solar collectors.

Current ASTM standards concerned with the durability and reliability of absorptive coatings rely on integrated solar absorptance and emittance as the primary methods for assessing changes in absorber optical performance resulting from environmental exposure. This study was undertaken to determine if infrared reflectance measurements are a more sensitive technique for detecting absorber materials degradation. Spectral measurements were made to identify factors that could affect the reproducibility of infrared reflectance measurements and to compare their ability to detect changes with currently used methods for absorber materials. Recommendations are made concerning the use and limitations of infrared reflectance measurements for this purpose.

400,020
PB85-113603 PC A08/MF A01
 National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
NBS (National Bureau of Standards) Solar Collector Durability/Reliability Test Program: Final Report,
 D. Waksman, W. C. Thomas, and E. R. Streed. Sep 84, 153p NBS/TN-1196
 Also available from Supt. of Docs as SN003-003-02611-5. Sponsored in part by Department of Energy, Washington, DC. Prepared in cooperation with Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Mechanical Engineering. Errata sheet inserted. See also PB81-166571.

Keywords: *Performance tests, Quality assurance, Reliability, Durability, Deterioration, Degradation, Project planning, *Solar collectors.

In this research, eight different types of flat-plate solar collectors were exposed outdoors at four sites located in different climatic regions. Small scale cover and absorber materials coupon specimens consisting of samples taken from a collector of each of the eight types used and a number of additional materials were exposed concurrently with the full-size collectors. Periodic measurements were made of collector and materials performance as a function of outdoor exposure time. Indoor laboratory aging tests were conducted concurrently on specimens of the same materials to provide a basis for comparison with the outdoor exposure tests. This report presents the results obtained in this test program. Recommendations are made regarding the use and limitations of performance measurements and environmental exposure tests for assessing the durability of solar collectors and absorber and cover materials.

400,021
PB85-119469 PC A04/MF A01
 National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Measurement Techniques for Evaluating Solar Reflector Materials.
 Final rept.,
 J. C. Richmond. Sep 84, 74p NBS/GCR-84/475
 Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Solar reflectors, *Materials, Measurement, Evaluation, Service life, Performance tests, Manufacturing, Bibliographies, Mirrors.

Solar reflector materials are used to concentrate the terrestrial solar irradiance on a solar receiver in order to increase the temperature of the working fluid in a solar energy system. To ensure acceptable performance and service life of the materials used in reflectors, data must be available prior to the design, construction and use of reflectors. These data must be generated by reliable measurement techniques. This report assesses the current state-of-the-art of technology associated with the manufacture and evaluation of solar reflector materials and includes an identification of numerous research needs and a bibliography of 124 relevant documents.

400,022
PB85-120715 Not available NTIS
 National Bureau of Standards, Washington, DC.
Influence of Degree Day Base Temperature on Building Energy Prediction.
 Final rept.,
 D. Nall, and E. Arens. 1979, 15p
 Pub. in American Society of Heating, Refrigerating and Air-Conditioning Engineers Transactions 85, pt. 1 p707-721 1979.

Keywords: *Buildings, Temperature, Analysis(Mathematics), Predictions, Climate, Standards, Reprints, *Energy consumption, *Energy forecasts, Degree days.

This report investigates the use of base temperatures other than the traditional 65F (18.3C) value as an improvement to the degree day method of predicting energy consumption in buildings. Evidence of building balance point temperatures other than 65F (18.3C) from monitored buildings is presented. Methods of calculating base temperatures are evaluated, and the thermal behavior of one building is analyzed for different climates. Finally, the application of degree days of varying bases to the creation of climate zones for use with building energy standards is discussed.

400,023
PB85-146868 PC A04/MF A01
 National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Multi-Year Plan for Experimental Systems Research-Passive and Hybrid Solar Energy Program,
 J. Greenberg. Nov 84, 53p NBSIR-84/2972
 Contract DE-A101-76PR06010

Keywords: *Solar energy, *Research management, Project planning, Facilities, Economic factors, Performance, Buildings, Passive solar heating systems, Passive solar cooling systems, Hybrid systems.

This report addresses the development of a multi-year plan for Experimental Systems Research focused at gaining the necessary knowledge to advance the un-

derstanding of passive and hybrid solar energy technology. This understanding includes the ability to acquire building performance data under controlled conditions so that the fundamental mechanism of the driving forces that effect change, along with the resulting change, can be studied. It includes the process whereby through a series of working meetings and exchange of correspondence, a list of candidate research areas were identified for both heating and cooling technologies. These research areas are defined and ranked and a resulting list of priorities established. This report articulates the results of this effort and details the recommended Experimental Systems Research Activities for solar passive and hybrid technologies for FY85 and beyond.

400,024
PB85-111201 PC A13/MF A01
 National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Phase Change Thermal Energy Storage and the Model Building Codes.
 Final rept.,
 J. Greenberg, and B. C. Reeder. Aug 84, 294p NBSIR-84/2909
 Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Building codes, *Heating systems, *Cooling systems, Solar energy, Latent heat, Plumbing, Heat of fusion, Hydrates, Thermochemistry, Design criteria, Performance evaluation, *Thermal energy storage equipment, *Phase change materials.

Thermal energy systems using phase change materials are currently being developed and used for storing energy collected by solar and other means. This report is intended to bridge the gap between those who design and install phase change thermal storage devices and the building code official who evaluates these devices for code compliance. The initial pages of this report describe the more commonly accepted phase change materials and systems, present a taxonomy which is applicable to building construction, and describe the interface between the various model codes and the more advanced phase change system configurations. The report continues with an analysis of the model codes with a specific orientation to phase change thermal energy storage systems. The analysis is structured according to building, mechanical, and plumbing issues with topics relevant to phase change systems identified and specific code provisions applicable to each topic listed. To facilitate use by code officials in evaluating a system for compliance with a specific document, the appendix cross references relevant topics according to individual model code requirements.

400,025
PB85-146876 PC A03/MF A01
 National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Evaluation of Ettringite and Related Compounds for Use in Solar Energy Storage.
 Progress rept.,
 L. J. Struble, and P. W. Brown. Oct 84, 46p NBSIR-84/2942
 Sponsored by Department of Energy, Washington, DC. Office of Solar Heat Technologies.

Keywords: *Solar energy, *Energy storage, *Synthesis(Chemistry), Performance evaluation, Phase transformation, Enthalpy, Specific heat, Temperature, *Phase change materials, *Latent heat storage, *Ettringite.

This report describes an investigation of ettringite and related phases for potential application in solar energy storage. The specific objective is to evaluate the potential of ettringite dehydration and rehydration as a phase change for energy storage. Synthesis procedures have been developed, and a number of ettringite-type phases have been prepared. The heat capacity of each phase was approximately 0.3 calories per gram per degree Celsius. Studies of the dehydration of these phases at atmospheric pressure indicate that the material has good potential as a phase change material for solar energy storage. Dehydration occurred at temperatures in the range between approxi-

mately 30C and 55C, with changes in enthalpy ranging between 100 and 240 calories per gram sample. In addition, ettringite was found to have a reversible hydrothermal reaction at approximately 50C, with an enthalpy change of approximately 4 calories per gram sample. Future work during the remainder of this program will involve completing the work described in the present progress report.

400,026
PB84-141787 PC A03/MF A01
National Bureau of Standards, Boulder, CO. National Engineering Lab.
Performance Criteria for Restoration Coatings for Porcelain Enamel Surfaces.
J. F. Seiler, and P. G. Campbell. Sep 83, 35p NBSIR-83-2781
See also PB82-252024. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Div. of Energy, Building Technology and Standards.

Keywords: *Protective coatings, *Renovating, *Enamels, *Organic coatings, Field tests, Performance evaluation, Surfaces, Assessments.

In June 1982, the results of a laboratory-based study to develop interim performance criteria for restoration coatings for porcelain enamel surfaces were reported in NBSIR 82-2553, 'Development of Interim Performance Criteria for Restoration Coatings for Porcelain Enamel Surfaces'. Additional studies, consisting of a one-year field test of three of the five restoration coatings studied in the laboratory, were performed to assess the effectiveness of the interim performance criteria. The field test included periodic evaluation of the three restoration coatings applied to a total of nine bathtubs in public housing units in Alexandria, Virginia. The results of the field test were compared to the previous laboratory results and showed that the interim performance criteria were effective in selecting durable restoration coatings. This report presents the findings of the field test and includes the final performance criteria.

400,027
PB84-225416 Not available NTIS
National Bureau of Standards, Washington, DC.
Nondestructive Corrosion Detection Under Organic Films Using Infrared Thermography.
Final rept.,
M. E. McKnight, and J. W. Martin. 1982, 10p
Pub. in Proceedings of National SAMPE (Society for the Advancement of Material and Process Engineering) Tech. Conference (14th), Atlanta, GA., October 12-14, 1982, p349-358.

Keywords: *Nondestructive testing, *Protective coatings, *Corrosion, *Polymer films, *Infrared detectors, *Thermography, Organic coatings.

A rapid, nondestructive testing procedure, using infrared thermography, has been developed for detecting corroded and blistered areas under pigmented organic coatings on metallic substrates. Both invisible corroded areas under intact pigmented films, and corroded and blistered areas visible to the eye, can be detected, thus providing an early, accurate assessment of degradation. Software is being written to digitize the image and send the data to a computer for mathematical analysis, graphic display and storage. Modifications of the existing system are being considered to increase the resolution of the measurement.

400,028
PB85-142784 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Optical-Properties of Black Chrome - A Model for Predicting the Effect of Exposure to Elevated Temperature.
Final rept.,
S. T. Wu, and L. W. Masters. 1982, 5p
Sponsored by Department of Energy, Washington, DC. Pub. in Jnl. of Coatings Technology 54, n691 p41-45 1982.

Keywords: Optical properties, Reprints, *Black chrome.

The paper summarizes the first phase of research to help meet the need for predictive models. The scope of this initial phase of research was to develop a model

on predicting the effects of elevated temperature on the optical properties of black chrome. Oven aging tests were performed in the laboratory at temperatures of 150C, 200C, and 250C. The permanent change in optical properties was found to reach a maximum within only a few days after initiation of the exposure. The nature of the change in reflectance spectra was found to be a horizontal shift along the wavelength axis. The model was developed based on these findings. Reasonable numerical fits were made by applying the model to the test data.

400,029
PB84-135607 PC A06/MF A01
National Bureau of Standards, Washington, DC.
Air Quality Criteria for Storage of Paper-Based Archival Records.
R. G. Mathey, T. K. Faison, S. Silberstein, J. E. Woods, and W. B. Johnson. Nov 83, 112p NBSIR-83-2795
Sponsored in part by General Services Administration, Washington, DC., and National Archives and Records Service, Washington, DC.

Keywords: *Archives, *Air pollution, *Papers, *Environmental engineering, Sulfur dioxide, Nitrogen oxides, Ozone, Temperature, Humidity, Storage, *Air quality, *Air pollution effects(Materials).

Criteria for temperature, relative humidity, and gaseous and particulate contaminant concentrations are proposed for spaces used for storage and preservation of paper-based archival records. The criteria are based on available information from the literature, and recommendations of the January 19-20, 1983, National Bureau of Standards Workshop on Environmental Conditions for Archival Storage. Methods are discussed for meeting these criteria. Air quality criteria are proposed for different categories for archival storage. Factors to consider in the design of archival storage facilities are addressed and recommendations made to aid in the design of environmental conditioning systems for these facilities. A review of literature describes the damage that may be caused by high temperature, high and low relative humidity, and air pollutants to paper-based records. Results of measurements of temperature, relative humidity, air exchange rate, and gaseous contaminant concentrations (sulfur dioxide, nitrogen oxides, and ozone) in the National Archives Building in Washington, D.C., are presented. These measurements are compared with those made in other buildings having controlled environments.

400,030
PB84-154004 PC A05/MF A01
National Bureau of Standards, Washington, DC. National Engineering Lab.
Calibration of Temperature Measurement Systems Installed in Buildings.
Building science series (Final),
C. W. Hurley, and J. F. Schooley. Jan 84, 87p NBS-BSS-153
Also available from Supt. of Docs. as SN003-003-02546-1. Library of Congress catalog card no. 83-600622.

Keywords: *Calibrating, *Temperature measuring instruments, *Buildings, Thermometers, Resistance thermometers, Thermocouples, Thermistors, Pressure, Thermopiles, Integrated circuits, Temperature control, Accuracy, Standards.

Energy Management Control Systems (EMCS) cannot function properly or efficiently without accurate temperature measurements since temperature is one of the fundamental measurements of any EMCS. This report was written for the purpose of describing various methods of on-site calibration of temperature sensing devices used in EMCS and to review the characteristics of these devices that are directly related to calibration. The significance of recording the results of each calibration is emphasized and the possible effects of systematic errors in temperature monitoring systems is discussed.

400,031

PB84-182146 PC A05/MF A01
National Bureau of Standards, Washington, DC. National Engineering Lab.
Laboratory Evaluation of the Steady-State and Part Load Performance of Absorption Type Heating and Cooling Equipment.
R. Radermacher, M. McLinden, S. Klein, and D. Didion. Mar 84, 93p NBSIR-84-2816
Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Heat pumps, *Water chillers, Flow rate, Temperature gradients, Cooling load, Mathematical models, Valves, Seasonal variations, Computer applications.

In this investigation, an absorption water chiller and an absorption heat pump were extensively tested under steady-state and cyclic operating conditions. Since the tests were performed on two different units, one for a cooling only and one for a heating only application, the report is set up in two parts discussing the results of the testing of each unit separately.

400,032
PB84-217447 PC A07/MF A01
National Bureau of Standards (NEL), Washington, DC. Center for Building Technology.
Test Methods and Standards Development for Active Solar Heating and Cooling Systems.
Final rept.,
H. R. Trechsel, and B. L. Collins. Apr 84, 145p
NBSIR-84-2845
Contract DE-AI01-76PR06010

Keywords: *Solar heating, Tests, Standards, Heat storage, Materials, Residential buildings, Solar collectors, *Solar water heating, Solar absorbers.

Since test methods and standards for active solar heating and cooling systems did not exist in 1976, the Department of Energy sponsored research at the National Bureau of Standards (NBS) and other laboratories to aid in the development of research-based standards. This research was intended to facilitate a sound data base for the development of national consensus standards and test methods. In the present report, research by NBS and other laboratories is described for solar domestic hot water systems, solar collectors, thermal storage devices and collector materials. For collectors, the report describes research and test methods for determining the performance of cover plates, absorber materials, collector insulation, gaskets and sealants, rubber hose, containment materials, and heat transfer fluids.

400,033
PB84-221621 Not available NTIS
National Bureau of Standards, Washington, DC.
Simplified Methods for Determining Seasonal Heat Loss from Uninsulated Slab-on-Grade Floors.
Final rept.,
T. Kusuda, and J. W. Bean. 1984, 22p
Pub. in American Society of Heating, Refrigeration and Air-Conditioning Engineers Transactions 90, pt. 1 p611-632 1984.

Keywords: *Floors, *Slab on ground construction, *Heat loss, Green's function, Fourier transformation, Comparison, Finite element analysis.

Three different types of slab-on-grade heat loss calculation procedures are discussed and compared with each other. The procedures discussed are the Green's function type solution, Delsantes Fourier Transform type solution and the Mitalas procedure derived from the finite element analysis. Although the Green's function and Delsante type solutions agree very well with each other, the Mitalas solution showed a larger time lag effect resulting in lower winter heat loss and much higher summer floor heat loss than those determined by the other two methods.

400,034

PB84-221985

Not available NTIS

National Bureau of Standards, Washington, DC.

Effective Use of Daylighting.

Final rept.,

S. J. Treado, and G. L. Gillette. Jun 83, 9p
Pub. in Proceedings of the Energy Technol. Conf.
(10th), Washington, DC., 28 Feb-2 Mar 83, p647-655
Jun 83.

Keywords: *Daylighting, Buildings, Architecture, Windows, Cooling load, Heating load, Effectiveness, Energy analysis.

The type, size and configuration of fenestration apertures have a strong impact on building lighting, heating and cooling loads. Daylight utilization has been shown to have good potential for reducing lighting energy requirements; however, the effect of daylighting schemes on building space heating and cooling energy requirements must also be considered. Since the luminous efficacy of solar radiation is typically two or three times that of electric light sources, the substitution of the proper levels of daylight for electric lighting can reduce lighting and cooling loads substantially, while providing the additional psychological and aesthetic benefits traditionally associated with fenestration in buildings. This paper describes some of the results obtained from measurements and computer simulations regarding the optimum utilization of daylight in buildings. The findings are summarized in the form of design guidelines for effective fenestration utilization.

400,035

PB84-224302

PC A05/MF A01

National Bureau of Standards, Washington, DC.

Strategies for Energy Conservation for a School Building.

J. Y. Kao. Mar 84, 78p NBSIR-84-2831

Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Buildings, Heating, Air conditioning, United States, Regions, Comparison, Evaluation, Computerized simulation, *Energy conservation, *School buildings, BLAST computer program, Energy consumption.

A comparative analysis is made of the thermal performance of selected HVAC systems and control strategies commonly employed in education buildings. The comparisons are made for six geographical locations representing wide climatic variations within the continental United States. Hour-by-hour simulations with the BLAST computer program are used to obtain the yearly heating, cooling, and fan energy consumption of an elementary school. The HVAC systems simulated are constant volume reheat, variable air volume, dual-duct, and unit ventilator systems. The control strategies tested are dry-bulb temperature economy cycle, enthalpy economy cycle, supply air temperature resetting, and the combinations of these strategies. The results of these simulations are presented and discussed. Substantial energy consumption differences are shown to exist.

400,036

PB84-224344

PC A11/MF A01

National Bureau of Standards (NEL), Washington, DC.
Center for Building Technology.

Performance Criteria for Solar Heating and Cooling Systems in Commercial Buildings.

Final rept.

Apr 84, 232p NBS/TN-1187

Contract DE-AI01-76PRO6010

Also available from Supt. of Docs as SN003-003-02579-8.

Keywords: *Solar heating, Commercial building, Design, Development, Technology, Performance, Criteria, Solar water heating, Solar space heating, Solar air conditioning.

This document establishes baseline criteria for the design, development, technical evaluation and procurement of solar heating and cooling systems for commercial buildings. These performance criteria were developed in accordance with Public Law 93-409 the 'Solar Heating and Cooling Demonstration Act of 1975.' The document is intended as a resource for use in establishing minimum acceptance levels of performance for solar heating and cooling systems. Criteria which deal with public health and safety are in compliance with general building codes and standards. The criteria on thermal and mechanical performance, durability/reliability and operation/servicing present performance requirements considered to be representative of acceptable levels for conventional space conditioning equipment. By the use of performance language in the document, it is believed that sufficient latitude has been provided to allow innovation and flexibility that is essential for the stimulation of a viable solar industry.

400,037

PB84-226075

PC A05/MF A01

National Bureau of Standards (NEL), Washington, DC.
Center for Building Technology.

Performance and Selection Criteria for Mechanical Energy Saving Retrofit Options for Single-Family Residences.

E. Kweiler, and S. Silberstein. Jun 84, 77p NBSIR-84-2870

Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Residential buildings, *Heating systems, Houses, Water heaters, Heat pumps, Space heating, Insulation, Weathering, Performance evaluation, Standards, Cost analysis, Furnaces, Oil burners, Gas furnaces, *Energy conservation, Renewable energy sources, Waste heat utilization.

Under the Weatherization Assistance Program the U. S. Department of Energy (DoE) provides funds for energy-conserving building improvements in homes of low-income persons. In proposing to modify the program to also provide funds for energy-conserving mechanical options, DoE requested that the National Bureau of Standards investigate energy-conserving mechanical options that may be suitable for inclusion in the Weatherization Assistance Program. This report estimates energy savings, and provides performance and selection criteria, standards, and installed costs for mechanical equipment options for single-family homes; all from prior studies reported in the literature. Performance and selection criteria are presented as advantages, disadvantages and limitations for each option. Four broad categories of energy-saving mechanical options were investigated: space heating, water heating retrofit options, heat pump water heaters, and recovery of central air conditioner waste heat by desuperheaters. Gas- and oil-fueled forced-air furnaces and hydronic (hot water) space-heating equipment were treated in this report.

400,038

PB84-241496

PC A03/MF A01

National Bureau of Standards (NEL), Washington, DC.
Building Equipment Div.

Test Results and a Recommended Test Procedure for Heat Traps.

J. E. Harris. Mar 84, 30p NBSIR-84/2851

Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Water heaters, Gas appliances, Tests, Heat loss, Traps, Performance evaluation, *Energy conservation, *Heat traps, Procedures.

A series of standby loss tests was conducted on a 40 gallon gas water heater to determine the standby losses and the variability of those losses. Tests were run with both inlet and outlet plugged and insulated to determine the jacket losses, then tests were conducted with bare and insulated, vertical copper pipe, with and without heat traps. It was determined that the variability of the heat losses was large enough to conclude that the possible heat loss reduction by the use of heat traps could not be accurately detected and therefore the effectiveness of heat traps could not be accurately tested on gas water heaters. A recommended test procedure for heat traps was developed using a water heater simulator and then a number of tests were conducted with four different heat traps, in a variety of pipe sizes and material, bare and insulated, in vertical and horizontal orientations. It was recommended that the water heater simulator be used for any heat trap testing. It was also recommended that the heat trap credits currently given in the DOE water heater test procedure be dropped since any benefit of heat traps will be shown by the test results.

400,039

PB84-243997

Not available NTIS

National Bureau of Standards, Washington, DC.

Procedures for Determining Annual Efficiency for Furnaces and Vented Household Heaters with Modulating-Type Controls.

Final rept.,

E. Kweiler. Jun 83, 18p

Pub. in ASHRAE Transactions 89, Pt. 1-B, p301-318
Jun 83.

Keywords: *Furnaces, *Heating equipment, *Modulators, *Combustors, Households, Performance evaluation, Design criteria, Ignition time, *Energy conservation, Consumer products, Procedures.

As annual operating efficiency of vented heating equipment is affected by burner fuel and combustion air modulation, it is important to differentiate between the various types of controls in determining annual energy requirements. Test procedures for evaluating annual efficiency have already been developed and implemented by the Department of Energy (DOE) for furnaces with single-stage thermostat control. A modified test procedure is necessary to account for operation with fuel modulation. A revised procedure that accommodates two types of fuel-modulating controls has recently been developed. Tests are conducted at reduced and maximum firing rates, and part-load efficiencies for the two firing rates are calculated and weighted to obtain a weighted annual efficiency. A analysis of weather data is used to obtain outdoor average temperatures for calculating infiltration losses and for the weighting fractions used. These test methods and calculation procedures are based on and are an extension of the current DOE test procedures for the single-stage type of thermostat control of central warm air furnaces.

400,040

PB84-246032

Not available NTIS

National Bureau of Standards, Washington, DC.

Daylighting Computation Procedure for Use In DOE-2 and Other Dynamic Building Energy Analysis Programs.

Final rept.,

G. Gillette, and T. Kusuda. Jan 83, 11p

Sponsored in part by National Fenestration Council, Topeka, KS.

Pub. in Jnl. of the Illuminating Engineering Society 12, n2 p78-85 Jan 83.

Keywords: *Daylighting, Computerized simulation, Buildings, Reprints, *Energy conservation, Energy analysis, Passive solar heating systems.

A computer model is discussed for estimating the annual energy performance of a daylighted building. The model is designed for inclusion into larger building energy simulation programs such as DOE-2, BLAST, and NBSLD, where it will provide means of evaluating the impact of daylighting as it relates to the total building's energy requirements. Algorithms have been developed for giving hourly sky conditions, hourly interior daylight, and hourly adjusted electric lighting load. Extensive comparisons with field measurements show a correlation in most cases of within 30% of real conditions.

400,041

PB85-102788

Not available NTIS

National Bureau of Standards, Washington, DC.

Thermographic Inspection of Exterior Wall Insulation Retrofits.

Final rept.,

R. A. Grot, and Y. M. L. Chang. 1983, 16p

Sponsored in part by American Society for Testing and Materials, Philadelphia, PA., Department of Energy, Washington, DC, and Oak Ridge National Lab., TN.

Pub. in Proceedings of Thermal Insulation, Materials, and Systems for Energy Conservation in the 1980's, Clearwater, FL., December 8-11, 1981, p321-336 1983.

Keywords: *Heat loss, *Houses, Airtightness, Thermal insulation, Quality control, Analysis of variance, Houses, Thermal measurements, Low income groups, Defects, Reprints, Retrofitting, Weatherization.

A national demonstration of the effectiveness of an optimal weatherization program for low-income families was conducted by the Community Services Administration and the National Bureau of Standards. Of the original 200 some homes as participants, over 100 single-family dwellings in 12 cities in the continental United States were retrofitted and inspected with thermography equipment. The weatherization techniques included air infiltration reducing measures such as caulking & weatherstripping, additional attic insulation, storm windows, exterior wall insulation, basement/crawl space insulation, & modification or replacement of the heating systems. In order to assess the quality of the workmanship of the energy reducing measures applied to the building envelope, and in particular the quality of the installation of cavity wall insulation, thermographic surveys were performed after the completion of the weatherization work.

400,042
PB85-109627 PC A04/MF A01
 National Bureau of Standards (NEL), Washington, DC.
 Building Equipment Div.
Fortran 77 Computer Program for Test Procedure Calculations of Vented Heaters,
 R. A. Wise, and F. C. Parsons. Sep 84, 53p NBSIR-84/2918
 Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Space heaters, *Computer programs, Tests, Fortran, Vented heaters.

The Fortran 77 computer program described in the report is to be used to calculate results from tests run on vented heaters. The Department of Energy recently published a revised test procedure for such heaters but which contains a simplified method for testing with a number of testing options that allow more detailed tests to be run. The new procedure also provides for the testing of units with manual controls of two types, modulating controls of two types, and the testing of units incorporating thermal stack dampers as well as electro-mechanical dampers. Once input selections have been made, the program performs the calculations required and prints out the results.

400,043
PB85-120129 PC A05/MF A01
 National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Criteria for Mechanical Systems in Multifamily Buildings for Residential Weatherization Options,
 L. S. Galwin. Sep 84, 79p NBSIR-84/2939
 Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Residential buildings, *Heating equipment, *Construction materials, *Cooling systems, Criteria, Maintenance, Replacing, Performance, Regulations, *Weatherization, Retrofitting, Energy conservation.

The National Bureau of Standards (NBS) prepared the original criteria and list of eligible retrofit options adopted for energy conservation by the Department of Energy Conservation in Existing Buildings Act of 1976. NBS was requested to review, update, and expand the criteria and list of retrofits for 1984 amendments to the regulation. This report presents the criteria and reference standards for retrofit options of mechanical equipment and systems in multifamily buildings. Mechanical systems equipment, controls, energy management systems, burners, and boiler/furnace tune-ups/repairs were included. The options for retrofit technologies for equipment replacement components include items such as burners, burner controls, combustion chamber refractories, modifications with dampers, turbulators, and waste heat recovery devices. The criteria developed did not include economic factors and statutory constraints under the rulemaking procedures.

400,044
PB85-120657 Not available NTIS
 National Bureau of Standards, Washington, DC.
Experimental Evaluation of Engine-Driven Heat Pump Systems.
 Final rept.,
 B. R. Maxwell, and D. A. Didion. 1978, 18p

Pub. in Proc. ASME Winter Annu. Meet., Energy Conservation in Building Heat and Air Conditioning Systems, San Francisco, California, December 10-15 1978, p59-76.

Keywords: *Heat pumps, *Engines, *Drives, Stirling cycle engines, Diesel engines, Experimental data, Performance, Capacity, Heating, Cooling, Compressors, Temperature, Reprints, Energy conservation, Coefficient of performance.

A laboratory investigation was conducted of an engine-driven air-to-air, variable speed, 3-ton Rankine heat pump. A water-cooled Stirling engine was used in one series of tests and a water-cooled Diesel engine of comparable size was used in another series. The steady-state part-load performance of both engine-driven systems was determined as a function of outdoor temperature and compressor speed. Engine coolant energy and recoverable exhaust energy were determined and included in the heating mode calculations. Heating and cooling capacities, system coefficients of performance, and seasonal performance factors were determined for both systems. Additional tests were concerned with defrost-mode energy requirements and the influence of coolant temperature on system performance.

400,045
PB85-141430 Not available NTIS
 National Bureau of Standards, Gaithersburg, MD.
Performances of Different Passive Solar Systems at the NBS (National Bureau of Standards) Test Facility.
 Final rept.,
 B. M. Mahajan, S. T. Liu, and K. A. Reed. 1984, 6p
 Sponsored by Department of Energy, Washington, DC.
 Office of Solar Heat Technologies.
 Pub. in American Society of Mechanical Engineers Technical Paper 84-WA/Sol-3, 6p 1984.

Keywords: *Solar heating, Performance evaluation, Temperature, Wind velocity, Wind direction, Test facilities, Instruments, Reprints, *Passive solar heating systems, Trombe walls, Air infiltration, Energy consumption.

This paper compares the measured winter-time performances of three full-sized adjoining rooms each with a different south-facing passive solar feature. These rooms are a direct gain cell, a control cell, and a Trombe wall cell in the NBS passive solar test facility. The performances of these three cells were monitored for a period of three weeks during January-February, 1984 under the following experimental conditions: lower-bound temperature fixed and upper-bound temperature free floating in all cells; and vents of the Trombe wall blocked. During the experiment data from about 426 sensors are collected. The data include: auxiliary energy supplied, continuous air infiltration, temperatures, and wind speed and direction. This paper briefly describes the test facility, instrumentation, data acquisition system and procedures, and presents representative results from the performance monitoring experiment.

400,046
PB85-143311 Not available NTIS
 National Bureau of Standards, Gaithersburg, MD.
Criteria for Recommending Lighting Levels.
 Final rept.,
 G. T. Yonemura. 1981, 17p
 See also PB81-185126. Sponsored by Department of Energy, Washington, DC. Office of Building and Community Systems.
 Pub. in Light Research and Technology 13, n3 p113-129 1981.

Keywords: *Illuminating, Luminous intensity, Human factors engineering, Visual perception, Visibility, Criteria, Reprints.

The role of lighting on behavior ranges from allowing simple detection of objects to creating moods and impressions. Lighting standards and recommendations

for general applications should be based on the visibility (seeing) requirements where differences between individuals are minimal. The evaluative visual response where significant differences in interpretations and evaluations between individuals and/or groups of individuals do occur cannot be universally applied, but should be treated as design options to be applied when they are important aspects of the intended function of the space. But the lighting criteria or standard must evaluate the seeing process under stimulus conditions approximating those encountered in the real space. It is recommended that conspicuity, defined as: 'how well the detail stands out from the background', or ease of seeing be the metric for visibility.

400,047
PB85-144905 Not available NTIS
 National Bureau of Standards, Gaithersburg, MD.
Impact of Building Codes and Regulations on Indoor Air Quality.
 Final rept.,
 P. E. McNall. 1984, 5p
 Sponsored by American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA.
 Pub. in Proceedings of Engineering Foundation Conference on Management of Atmospheres in Tightly Enclosed Spaces, Santa Barbara, CA., October 17-21, 1983, p57-61 Jun 84.

Keywords: *Building codes, *Air pollution, Standards, Design criteria, Ventilation, Regulations, Assessments, *Indoor air pollution, *Air quality.

In the United States there is a comprehensive complex and often inconsistent system of regulations which relates to building design, construction and occupancy. These regulations, in the various states, are examined to assess the technical bases for their ventilation provisions and to determine if they permit innovation in indoor and air quality technology.

400,048
PB85-145407 Not available NTIS
 National Bureau of Standards, Gaithersburg, MD.
Climate Data Abbreviation for the Computerized Calculation of Heating and Cooling Requirements in Buildings.
 Final rept.,
 D. H. Nall, and E. A. Arens. 1979, 15p
 See also PB-289 927.
 Pub. in Energy and Buildings 2, n2 p135-149 Apr 79.

Keywords: *Heating load, *Cooling load, *Climate, Weather, Thermal analysis, Buildings, Data, Computation, Reprints, *Energy consumption.

This paper documents the development of a climate data abbreviation technique for building thermal analysis. The paper first discusses the need for and requirements of abbreviated data. The technique is then described together with the statistical analyses used to develop it. A series of tests of the representativeness of the abbreviated climate data are documented. Finally, the limitations and potentials of the abbreviation technique are discussed.

400,049
PB85-151561 Not available NTIS
 National Bureau of Standards, Gaithersburg, MD.
Ventilation Concepts for Office Buildings.
 Final rept.,
 P. E. McNall, and A. K. Persily. 1984, 10p
 Sponsored by American Conference of Governmental Industrial Hygienists, Inc., Cincinnati, OH.
 Pub. in Annual American Conference of Governmental Industrial Hygienists 10, p49-58 1984.

Keywords: *Office buildings, *Ventilation, Heating equipment, Air conditioning equipment, Reprints, Air quality.

This paper describes several heating, ventilating, and air-conditioning (HVAC) systems which are commonly used in new and existing office buildings. These systems are analyzed from the viewpoint of how well they provide ventilation to the interior spaces for air quality

purposes. Several problems are identified, which need further research to ensure adequate ventilation for air quality.

400,050
PB85-153443 PC A05/MF A01
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.

Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.

Final rept.,
R. D. Dikkers, W. J. Kennish, C. B. Winn, and W. Huston. Dec 84, 76p NBSIR-84/2980

Contract DE-AI01-76PR06010
Prepared in cooperation with TPI, Inc., Beltsville, MD. and Solar Environmental Engineering Co., Inc., Fort Collins, CO.

Keywords: *Solar heating, *Solar water heating, *Research management, Maintenance, Research projects, Project planning, Performance evaluation, Reliability, Tests, Control equipment.

As part of the FY 1983 Department of Energy Systems Effectiveness Research Program, the National Bureau of Standards (NBS) was assigned responsibility for developing research priorities for improving the effectiveness (i.e., thermal performance, cost, reliability and maintainability) of active solar hot water and space conditioning systems. To carry out this task, NBS, in cooperation with various industry representatives, organized and conducted two meetings in August 1983. The first meeting covered all major aspects of active solar hot water and space conditioning systems. The second meeting dealt only with solar control subsystems. Based on information obtained from these meetings, recommended research priorities for improving the effectiveness of active solar energy systems are presented.

400,051
PB85-163376 PC A03/MF A01
Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.

Thickness Effect in Low-Density Insulation,
P. J. Burns. Aug 84, 48p NBSIR-84/2906
Sponsored by Department of Energy, Washington, DC.

Keywords: *Thermal insulation, Thickness, Glass fibers, Heat transfer.

A discussion is presented of theory of heat transfer in low-density, glass-fiber insulation via conduction, convection, and radiation. It is concluded that the primary modes of heat transfer in this material are air conduction and radiation. An analysis of NBS data of measured apparent thermal conductivity for different thicknesses results in a parameter estimate of the optical extinction coefficient. This parameter determines the amount of change in apparent thermal conductivity as a function of sample thickness. This phenomena is referred to as the 'thickness effect'.

400,052
PB85-163392 PC A04/MF A01
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.

Short Duration Winter-Time Performances of Different Passive Solar Systems,

B. M. Mahajan. Sep 84, 59p NBSIR-84/2930
Sponsored by Department of Energy, Washington, DC.

Keywords: Performance, Buildings, Data, *Passive solar heating systems, Trombe walls.

The report describes the test building, instrumentation, data acquisition system and procedures, and test conditions for the two performance monitoring experiments. The report contains representative data from the two performance monitoring experiments and results from a preliminary analysis of the data, and compares the performance of the three test cells. The data presented include: solar radiation; wind speed and air infiltration; ambient and room air temperatures; average, centroidal, maximum and minimum room air temperatures in the direct gain and Trombe wall cells; cell floor surface temperatures; and auxiliary energy supplied. The report also contains predicted values of the ratios of various irradiation quantities and the auxiliary energy required to maintain the cells at 20C, and compares the predicted values with the measured data.

400,053
PB84-218072 PC A03/MF A01
National Bureau of Standards (NEL), Washington, DC. Structures Div.

Responses to Questions by the General Accounting Office Related to Construction of the Sunshine Skyway Bridge,
N. J. Carino. Jun 84, 30p NBSIR-84/2892

Keywords: *Construction, *Highway bridges, Investigations, Cracks, Bridge piers, Safety, Loads(Forces), Reinforced concrete, Mixtures, Florida, *Sunshine Highway Bridge.

The General Accounting Office (GAO) requested the assistance of the National Bureau of Standards in the investigation of the construction of the new Sunshine Skyway Bridge in Florida. Specifically, GAO desired answers to questions related to the following: (1) the formation of cracks in the main piers of the bridge span; (2) the materials used in the concrete mixtures; and (3) the procedures used in the placement of concrete in the drilled shaft foundations. The objective of the GAO inquiry is to determine the reasonableness and validity of the positions taken by the Florida Department of Transportation on each of the concerns expressed by a number of individuals in connection with the bridge construction. This report provides answers to the questions and provides explanations for each answer.

400,054
PB84-222108 Not available NTIS
National Bureau of Standards, Washington, DC.
Recent Indoor Air Quality Research in the United States.

Final rept.,
S. Silberstein. 15 Jun 84, 8p
Pub. in Proceedings of Workshop on Indoor Air Quality Energy Conservation, Otaniemi, Finland, June 15, 1984, pIX-1-IX-8.

Keywords: *Air pollution, *Houses, *Office buildings, United States, Research projects, Residential buildings, *Indoor air pollution, *Air quality.

Representative examples of indoor air quality research in the United States are described in order to illustrate recent developments.

400,055
PB84-227404 Not available NTIS
National Bureau of Standards, Washington, DC.
Investigation of East Chicago Ramp Collapse.

Final rept.,
N. J. Carino, H. S. Lew, and W. C. Stone. Mar 84, 18p
Pub. in ACSE Jnl. of Construct. Eng. Manage. 110, n1 p1-18 Mar 84.

Keywords: *Highways, *Ramps, *Collapse, Investigations, Failure, Structural analysis, Accidents, Structural members, Cracking(Fracturing), Concrete structures, Indiana, East Chicago(Indiana).

A summary is presented of the investigation performed by the National Bureau of Standards (NBS), at the request of the Occupational Safety and Health Administration, to determine the most likely cause of the collapse of a portion of a highway ramp in East Chicago, Indiana. The investigative effort included an extensive field study to ascertain the conditions prior to and after the accident. In addition, the NBS performed physical tests on key components of the temporary support system used to build the ramp. A structural analysis was performed to compute the magnitude of the forces acting in various components of the support system prior to the failure. The calculated forces were compared with the expected strengths of the structural components. It was concluded that the most likely triggering mechanism of the collapse was the cracking of concrete pads supporting a shoring tower. It was further concluded that there were four deficiencies that contributed directly to the collapse. Had any of these deficiencies not existed, it is unlikely that the collapse would have occurred.

400,056
PB84-221969 Not available NTIS
National Bureau of Standards, Washington, DC.
Comparison of Analytical with Experimental Internal Strain Distribution for the Pullout Test.

Final rept.,
W. C. Stone, and N. J. Carino. Feb 84, 10p
Pub. in Jnl. of the American Concrete Institute 81, n1 p3-12 Jan-Feb 84.

Keywords: *Concretes, *Strain measurement, *Cracking(Fracturing), Strength, Tests, Determination of stress, Reprints, Finite element analysis, *Pullout tests.

Axisymmetric, two-dimensional, linear-elastic finite element solutions for the internal strain distribution of the pullout test were compared with experimental data from two large-scale pullout tests. Good agreement was found between experimental and analytical strains up to the load which caused first cracking in the laboratory specimens.

400,057
PB84-221977 Not available NTIS
National Bureau of Standards, Washington, DC.
Deformation and Failure in Large-Scale Pullout Tests.

Final rept.,
W. C. Stone, and N. J. Carino. Dec 83, 13p
Pub. in Jnl. of the American Concrete Institute 80, n6 p501-513 Nov-Dec 83.

Keywords: *Concretes, *Cracking(Fracturing), *Strain measurement, Failure, Crack propagation, Loads(Forces), Compressive strength, Reprints, *Pullout tests.

An experimental study was performed to gain an understanding of the failure mechanism of the pullout test. Two large-scale pullout inserts were fabricated and embedded in large concrete blocks. Micro-embedded strain gages were placed in the concrete to measure the internal strain distribution in critical regions. Insert disk displacements were also measured along the line of load application.

400,058
PB84-229491 Not available NTIS
National Bureau of Standards, Washington, DC.
Impact Resistance of Concrete.

Final rept.,
J. R. Clifton, and L. I. Knab. 1 Jun 81, 5p
Sponsored in part by Defense Nuclear Agency, Washington, DC. See also PB84-228165.
Pub. in Proceedings of Annual Symposium Role of Behavioral Science in Physical Security (5th), Gaithersburg, MD., June 11-12, 1980, p49-53, 1 Jun 81.

Keywords: *Concrete, *Impact strength, Performance evaluations, Dynamic properties, Dynamic loads, Security.

The effects of dynamic loading on concrete is experimentally investigated, appropriate performance tests are developed, and the materials under consideration for use in the construction of security barriers are delineated.

400,059
PB84-231067 PC A02/MF A01
National Bureau of Standards (NEL), Washington, DC. Center for Building Technology.

Selection, Procurement, and Description of Salem Limestone Samples Used to Study the Effects of Acid Rain,

M. Ross, and L. Knab. Jul 84, 23p NBSIR-84/2905
Sponsored in part by National Park Service, Washington, DC. Prepared in cooperation with Geological Survey, Reston, VA.

Keywords: *Building stones, *Weathering, *Limestone, Exposure, Assessments, Geology, Marking, Surface finishing, Air pollution, *Acid rain, *Air pollution effects(Materials), *Salem limestone, Building materials.

This report describes the selection, procurement, and description of the Salem Limestone to be used in field exposure tests to assess the effects of acid rain on building stone. The rationale for choosing Salem Limestone is given and a brief geological description of the stone is provided. Preparation of the stone samples for field exposure, including cutting, surface finishing and labeling, is presented.

400,060

PB84-234509 PC A03/MF A01
National Bureau of Standards (NEL), Washington, DC.
Center for Building Technology.
Pulse-Echo Method for Flaw Detection in Concrete.
Final rept.,
N. J. Carino, and M. Sansalone. Jul 84, 42p NBS/TN-1199
Also available from Supt. of Docs as SN003-003-02601-8.

Keywords: *Concrete, *Ultrasonic tests, Nondestructive tests.

The basic principles of the pulse-echo method for the detection of internal flaws in concrete are presented. As the heterogeneous nature of concrete poses problems not encountered in pulse-echo evaluation of metals, progress in this area of concrete nondestructive testing has been slow. A review of past research shows that pulse-echo techniques have been used successfully to detect flaws within concrete; however, no standardized method currently exists for pulse-echo evaluation of concrete structures. Based on the current state of knowledge, areas of needed research are outlined.

400,061

PB85-106391 PC A04/MF A01
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Ring-on-Ring Tests and Load Capacity of Cladding Glass.
Final rept.,
E. Simiu, D. A. Reed, C. W. C. Yancey, J. W. Martin, and E. M. Hendrickson. Aug 84, 64p NBS/BSS-162
Grant NSF-CEE83-08329
Also available from Supt. of Docs as SN003-003-02605-1. Library of Congress catalog card no. 84-601098.

Keywords: *Sheet glass, Panels, Glass, Heat treated glass, Failure, Computer programs, Surface defects, Estimates, Test equipment, Probability theory, Tests, Buildings, Fracture strength, Loads(Forces).

Although ring-on-ring test results have been used in the past to obtain information on the strength of glass, no methodology has so far been developed in the literature explicitly relating such results to the load capacity of cladding glass. The main purpose of this report is to propose such a methodology. The proposed methodology makes use of recent advances in the modeling of the fracture mechanics behavior of glass and the calculation of stresses in plates exhibiting geometric nonlinearity. Evidence is presented which strongly suggests that the probability distribution of the load capacity of cladding glass panels whose failure is due to surface flaws can be estimated reliably on the basis of results of ring-on-ring tests used in conjunction with (a) numerical methods for the analysis of stresses in plates, and (b) information on the elastic and fracture mechanics behavior of glass currently available or that can be obtained routinely.

400,062

PB85-115558 Not available NTIS
National Bureau of Standards, Washington, DC.
Prediccion de la Resistencia del Concreto a Partir de su Madurez (Method for Prediction of Strength and Resistance of Concrete Based on the Maturity Concept).
Final rept.,
H. S. Lew, and T. W. Reichard. 1980, 9p
Pub. in Rev. IMCYC 18, n113 p35-40, 43-46, 30 Sep 80.

Keywords: *Concretes, Predictions, Strength, Curing, Compressive strength, Cements, Temperature, Age, Regression analysis, Reprints.

Prediction of potential strength of concrete based on the maturity concept is presented. The maturity, which is expressed as the integral of the curing temperature with respect to time, is related to the compressive strength of standard cylinders cured at 35F, 55F, and 90F. The relationship between the compressive strength and maturity is obtained by regression analysis. Other published data are also used in the analysis of the relationship. It is shown that the function relating the compressive strength with the logarithm of maturity is nonlinear and that the relationship is dependent on type of cement, water/cement ratio, and brand of cement for a given type.

400,063

PB85-119337 PC A04/MF A01
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Influence of Vertical Compressive Stress on Shear Resistance of Concrete Block Masonry Walls.
K. Woodward, and F. Rankin. Oct 84, 62p NBSIR-84/2929

Keywords: *Concrete blocks, *Masonry, *Walls, Structural analysis, Mortars(Materials), Shear tests, Shear properties, Axial stress, Compressive properties, Loads(Forces), Displacement, Cracks, Cracking(Fracturing).

The results from tests on eight ungrouted and unreinforced concrete block masonry walls are presented. The emphasis of the research program is the influence of vertical in-plane compressive stress on the lateral in-plane load resistance of the walls. Each wall has nominal dimensions of 64 in. x 64 in. x 8 in. and is fabricated from similar materials by the same experienced mason. The masonry units are hollow concrete block having a nominal compressive strength of 1800 psi based on the gross area. The mortar was proportioned as a Type S. The walls are tested in the NBS Tri-directional Testing Facility using fixed ended boundary conditions at the top and bottom of the wall. Lateral in-plane displacements were applied at the top of the wall while maintaining a constant compressive axial load. The vertical compressive stress varies between 120 and 500 psi (based on net cross-sectional area) in the test program. The test results indicate that there is a linear relationship between increasing amounts of vertical compressive stress and the resulting increased in-plane maximum lateral load resistance.

400,064

PB85-123628 Not available NTIS
National Bureau of Standards, Washington, DC.
Evaluation of the Sulfate Resistance of Cements in a Controlled Environment.
Final rept.,
P. Brown. 1981, 9p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Cement and Concrete Research 11, n5-6 p719-727 Sep/Nov 81.

Keywords: *Cements, *Corrosion prevention, *Sulfates, pH, Sulfuric acid, Reprints.

It was initially established that the maintenance of the pH of a sulfate solution in which mortar specimens were immersed at a constant and predetermined value through controlled sulfuric acid additions ensured that the sulfate ion concentration in solution remained invariant with time. The rates of sulfate attack of mortar specimens exposed under typical immersion and environmentally controlled conditions were then compared. It was observed that environmental control significantly increased the rate of sulfate attack as measured either by strength, loss or linear expansion. However, the strength changes and the expansions observed occurred in a manner consistent with the severity of the test conditions imposed.

400,065

PB85-129401 Not available NTIS
National Bureau of Standards, Washington, DC.
Mechanical Performance Model for Roofing Membranes.
Final rept.,
J. M. Pommersheim, R. G. Mathey, and J. R. Clifton. Jun 83, 19p
Pub. in Jnl. Struct. Eng. 109, n6 p1431-1449 Jun 83.

Keywords: *Roofing, Membranes, Roofs, Bonding, Performance, Mathematical models, Failure, Stresses, Strains, Mechanical properties, Joining, Fabrics, Felts, Bituminous coatings, Reprints.

The mechanical performance of built-up roofing membranes, fully bonded to an underlying deck or substrate was modeled. Both linear and nonlinear stress-strain behaviors were considered in the model development. The model is compared to previously developed models. It was found that the equality of the complementary strain energy of the fabric or felt layer with the strain energy of the bonding adhesive or bitumen layer governs both the conditions under which membrane integrity is lost and the mode of failure. Failure can occur either by membrane splitting or adhesive debonding. The testing criteria developed are applied to a sample case.

400,066

PB85-133981 PC A03/MF A01
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Procedure for Tristimulus Color Measurements on Building Stone.
L. I. Knab. Oct 84, 30p NBSIR-84/2961
Sponsored in part by National Park Service, Washington, DC.

Keywords: *Building stones, *Colorimetric analysis, *Air pollution, Surfaces, Exposure, Field tests, *Air pollution effects(Materials), *Acid rain.

This report describes a procedure used to measure the color of building stone surfaces using a specific tristimulus colorimeter with three color filters. Color changes are to be monitored during a ten year or more outdoor exposure period to determine the effects of acid rain on stone color. A step-by-step procedure is provided, including equipment calibrations and checks using standard reflectance panels, equipment checks using standard stone surfaces, and color measurements of stone surfaces which are to be, or have been exposed at field sites.

400,067

PB85-141505 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Laboratory Study of Flaw Detection in Concrete by the Pulse-Echo Method.
Final rept.,
N. J. Carino. Oct 84, 23p
Pub. in Proceedings of the International Conference on Nondestructive Testing of Concrete, Ottawa, Canada, Oct 3-5, 1984 p557-579.

Keywords: *Concretes, *Nondestructive tests, *Sonic tests.

A study was performed to evaluate the applicability of using the echoes from mechanically produced impact to locate hidden defects within concrete. The expected interactions of spherical waves with concrete-air interfaces are reviewed, and the results of experiments using artificial flaws in a large concrete slab are summarized. The following aspects were studied: type of impact source; distance from impact point to receiver; type of receiving transducer; depth of reflecting interfaces; and diffraction effects by sharp edges. The contact time of the impact is shown to be an important parameter for the success of the technique. The influence of the concrete thickness from impact point to the reflecting interface is an area of needed research.

400,068

PB85-142339 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Uses of Waste Materials and By-Products in Construction.
Final rept.,
J. R. Clifton, P. W. Brown, and G. Frohnsdorff. 1980, 22p
Pub. in Resource Recovery and Conservation 5, n2 p139-160 Jul 80.

Keywords: *Construction materials, Byproducts, Utili-

zation, Wastes, Reprints, *Wastes utilization.

A survey has been made of the sources, amounts and methods of disposal of major mining, industrial and municipal wastes available in the 48 counterterminous states of the United States. This includes the present and potential uses of these wastes as construction materials. While over 3 x 10 to the 9th power tons of waste materials are generated annually in the United States, only small amounts are being used by the construction industry. The low level of use does not yet reflect the advances being made in converting wastes into viable construction materials. In several cases, construction materials produced from wastes have been at least the technological equivalent of materials produced from virgin resources. Factors which are impeding the increased utilization of wastes are discussed and emerging incentives which could facilitate their increased use are covered.

400,069
PB85-109809 PC A03/MF A01
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Structural Reliability Fundamentals and Their Application to Offshore Structures,
E. Simiu, and C. E. Smith. Sep 84, 32p NBSIR-84/2921
Sponsored in part by Minerals Management Service, Reston, VA.

Keywords: *Offshore structures, Structural design, Structural engineering, Reliability, Service life, Safety factor, Design standards, Failure, Probability theory.

The objective of this report is to present an overview of fundamental topics in structural reliability as applied to individual members, which are potentially applicable to ocean engineering problems. These topics include: the estimation of failure probabilities; safety indices; and safety (or load and resistance) factors. Some of the theoretical and practical difficulties in the application of structural reliability tools are mentioned and/or discussed.

400,070
PB85-131878 PC A06/MF A01
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Field Hydraulic Performance of One- and Two-Story Residential Plumbing Systems with Reduced-Size Vents,
R. S. Wyly, and L. S. Galowin. Oct 84, 106p NBSIR-84/2860
Sponsored in part by Department of Defense, Washington, DC., and Department of Housing and Urban Development, Washington, DC.

Keywords: *Plumbing, Residential buildings, Vents, Performance.

The report describes hydraulic tests of drain-waste-vent systems with reduced-size vents installed in single-family housing units at Andrews Air Force Base, Camp Springs, Maryland. The vent systems of six field units were sized according to a procedure based on findings in prior laboratory investigations. The tests reported were conducted on three of the units before occupancy. Principal measurements made were trap-seal reduction and pneumatic pressure excursions in selected vents, using test procedures developed in the laboratory and adapted to field conditions. Results of the preoccupancy tests showed adequate performance with the reduced-size vents. A procedure for the design of reduced-size vent systems is presented that should be of interest to plumbing designers and groups engaged in updating plumbing codes.

400,071
PB85-118388 Not available NTIS
National Bureau of Standards, Washington, DC.
Criteria for Assuring Safety during Erection of Concrete Shell Structures.
Final rept.,
E. O. Pirang, and H. S. Lew. 1980, 3p
Sponsored in part by Laboratorio Central de Estructuras y Materiales, Madrid (Spain).
Pub. in Bulletin of the International Association for Shell and Spatial Structures 21-3, n74 p5-8 1980.

Keywords: *Safety engineering, *Construction, Criteria, Shells (Structural forms), Hyperbolic parabolic shells, Personnel, Hoisting, Personnel development,

Reinforced concrete, Reprints.

This paper summarizes criteria for assuring safety during construction of reinforced concrete hyperbolic shell structures. The criteria are based on the current U.S. regulations for concrete construction. The criteria highlight important provisions in regulations affecting the safety of workers. Special attention is given to those provisions covering construction loadings, construction sequences, hoisting systems and personnel safety training.

400,072
PB84-142231 PC A09/MF A01
National Bureau of Standards, Washington, DC.
Comparative Analysis of Thermographic Inspections Performed on Retrofitted Homes,
Y. L. Chang, and R. A. Grot. May 83, 191p NBSIR-83-2701
Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Residential buildings, *Thermal insulation, Heat loss, Temperature measuring instruments, Infrared equipment, Field tests, Performance evaluation, *Thermographic inspection.

An applied research program was sponsored by the Department of Energy to analyze and compare the results from inspections that utilized infrared sensing systems to identify thermal deficiencies in buildings. This research consisted of both the laboratory evaluation of the commonly used infrared sensing equipment for building inspections and the field evaluation of the accuracy and consistency of the results of thermographic surveys performed by various thermographic inspectors. The field evaluation of thermographic inspection performed by infrared contractors was undertaken using residences previously inspected by the National Bureau of Standards (NBS) as part of the Community Services Administration Weatherization Program. The results of the first phase was carried out in 1978-79 and published in a previous report. The present report contains the analysis and comparison of thermal anomalies detected by NBS and infrared contractors, during the second phase of this research program, on twenty single-family residences in five cities in 1980-81.

400,073
PB84-155894 PC A05/MF A01
National Bureau of Standards, Washington, DC. National Engineering Lab.
Documentation and Assessment of the GSA/PBS (General Services Administration/Public Buildings Service) Building Systems Program: Final Report and Recommendations,
F. T. Ventre. Dec 83, 85p NBSIR-83-2777
Sponsored in part by Public Buildings Service, Washington, DC. See also PB83-192807.

Keywords: *Buildings, *Project management, National government, Evaluation, Technology innovation, Procurement, Environments.

This report assesses the General Services Administration/Public Buildings Service's (GSA/PBS) Building Systems Program (BSP) and recommends methods for furthering the program's objectives. Lighting, air movement and temperature, acoustics, and the flexibility of interior space division in the six buildings completed under the BSP are evaluated by comparing field measurements made in February-April 1982 with the performance specifications for those four attributes at the time of procurement. The wider effects of the BSP innovations on the building community are qualitatively evaluated.

400,074
PB84-160993 PC A08/MF A01
National Bureau of Standards, Washington, DC. National Engineering Lab.
On-Site Calibration of Flow Metering Systems Installed in Buildings.
Building science series,
D. W. Baker, and C. W. Hurley. Jan 84, 157p NBS-BSS-159
Also available from Supt. of Docs. as SN003-003-02551-8. Library of Congress catalog card no. 83-600626. Sponsored in part by Civil Engineering Lab. (Navy), Port Hueneme, CA.

Keywords: *Flowmeters, *Buildings, Flow rate, Calibrating, *Energy management systems, *Energy conservation.

This report summarizes the various types of flowmetering devices used in energy management and control systems (EMCS), various methods for their initial calibration and, when practical, techniques for maintaining their calibration while they are in service. Emphasis is placed on the use of transfer reference meter systems, where the working meter is calibrated on site by connecting it in series with a calibrated transfer meter of any variety. Other methods of calibration are also described. Reference tables and the necessary equations for flow calculations are presented throughout the text and in the appendices. Illustrative examples are given in detail for the calculation of flow using each type of metering device described.

400,075
PB84-171610 PC A07/MF A01
National Bureau of Standards, Washington, DC. National Engineering Lab.
Status of Building Code Provisions for Solar Energy Systems.
Final rept.,
D. R. Conover. Feb 84, 140p NBS-GCR-84-460
Sponsored in part by Department of Energy, Washington, DC. Prepared in cooperation with National Conference of States on Building Codes and Standards, Inc., Herndon, VA.

Keywords: *Building codes, *Solar energy, Solar heating, Residential buildings, Technology assessment, Guidelines, *Solar cooling.

The recent increase in the use of solar energy systems has concurrently brought about an increased concern for health and life safety issues in buildings using solar energy systems. Some of these concerns, such as electrical connections and plumbing system design, have been addressed for years in the building codes used throughout the United States. Others, such as separation of potable water and toxic heat transfer fluids, have not received as much attention (especially in residential construction) until the increased use of solar energy systems. Regardless, those responsible for ensuring the safety of the U.S. building stock have needed code provisions with which to address the safety aspects of solar energy systems. The purpose of this report is to outline the current status of technical criteria the code enforcement community utilizes in regulating solar energy systems design and installation in new and existing building construction.

400,076
PB84-178284 PC A05/MF A01
National Bureau of Standards, Washington, DC.
Economizer Algorithms for Energy Management and Control Systems,
C. Park, G. E. Kelly, and J. Y. Kao. Feb 84, 82p NBSIR-84-2832
Sponsored in part by Department of Energy, Washington, DC. Office of Building and Community Systems, and Civil Engineering Lab. (Navy), Port Hueneme, CA.

Keywords: *Buildings, *Environmental engineering, Heating, Cooling, Algorithms, Computer programs, Fortran, Dry bulb temperature, *Energy management, *Energy conservation, Fortran 77 programming.

Economizer cycles have been recognized as important energy conservation measures for building air handling systems and have been included in most Energy Management and Control Systems (EMCS). This report describes the psychrometric processes of the most commonly used economizer cycles and presents algorithms for implementing these cycles on a typical Energy Management and Control System.

400,077
PB84-178847 PC A07/MF A01
National Bureau of Standards, Washington, DC. National Engineering Lab.
Directional Extreme Wind Speed Data for the Design of Buildings and Other Structures.
Building science series (Final),
M. J. Changery, E. J. Dumitriu-Valea, and E. Simiu. Mar 84, 127p NBS-BSS-160
Library of Congress catalog card no. 84-601008. Prepared in cooperation with National Climatic Center, Asheville, NC.

Keywords: *Structures, *Wind velocity, *Meteorological data, Data acquisition, Climatology, Statistical data, Periodic variations, Wind direction, Aerodynamics.

The purpose of this report is to provide largest yearly fastest-mile wind speed data corresponding to winds blowing from each octant at 37 airport stations in the United States. Four sets of data are presented. The first set consists of largest yearly fastest-mile wind speeds at 24 stations as extracted from original records. The second set consists of largest yearly fastest-mile wind speeds at 13 stations as extracted from Local Climatological Data (LCD) summaries. The third and fourth sets consist of the data from the first and second sets reduced to a height of 10 m above ground. The report also provides information on possible differences between extreme data extracted from original records on the one hand and from LCD summaries on the other hand. Procedures for estimating extreme wind effects that take into account the directional characteristics of the extreme wind climate and of the aerodynamic behavior of the structure are briefly reviewed, and it is noted that additional research on sampling errors in the estimation of extreme wind effects appears to be warranted.

400,078

PB84-216514 PC A05/MF A01
National Bureau of Standards (NEL), Washington, DC.
Building Equipment Div.

Test Procedures for Rating Residential Heating and Cooling Absorption Equipment,
B. Weber, R. Radermacher, and D. Didion. Apr 84,
79p NBSIR-84-2867
Sponsored in part by Oak Ridge National Lab., TN.

Keywords: *Residential buildings, *Heating, *Cooling, Gas heating, Gas cooling, Air conditioning equipment, Heat pumps, Seasonal variations, Performance evaluation.

Test and rating procedures are presented for gas-fired absorption devices operating in either the heating or cooling modes. These procedures are designed to include the effects of part-load and cyclic operation, variations in outdoor temperature, and frost formation during the heating mode. Both air-source and ground water source absorption heat pumps are considered, as well as air cooled and ground water cooled air-conditioners and water chillers. A calculation procedure is presented for estimating the heating and cooling seasonal performance and cost of operation of residential water chillers, air-conditioners, and heat pump units.

400,079

PB84-216522 PC A03/MF A01
National Bureau of Standards, Washington, DC.

Wind-Tunnel Study of Wind Loading on a Compliant Offshore Platform,
T. A. Morreale, P. Gergeley, and M. Grigoriu. Mar 84,
36p NBS-GCR-84-465

Prepared in cooperation with Cornell Univ., Ithaca, NY. School of Civil and Environmental Engineering. Sponsored in part by Minerals Management Service, Reston, VA. Color illustrations reproduced in black and white.

Keywords: *Offshore structures, *Platforms, Wind tunnel models, Wind direction, Static tests, Torsion, Loads (Forces), Structural engineering, *Wind loads.

Two models, with scales of 1/250 and 1/500, of an offshore oil platform were tested in a wind tunnel to obtain static forces for various wind directions. Two peak wind velocities were used: 54 fps and 108 fps. The measured shears and moments along wind were generally in reasonably good agreement with previous results obtained in a different wind tunnel using larger models. The agreement for transverse forces and moments and for torsion was not as satisfactory.

400,080

PB84-217025 PC A03/MF A01
National Bureau of Standards (NEL), Washington, DC.
Center for Building Technology.

Air Flow Calibration of Building Pressurization Devices,
A. K. Persily. Apr 84, 31p NBSIR-84-2849

Keywords: *Buildings, *Air flow, Air circulation, Doors, Calibration, Pressurizing.

Whole building pressurization devices, or blower doors, have been used to quantify building air-tightness and to determine compliance with air tightness standards. Using pressurization testing in air-tightness standards requires knowledge of the accuracy of the air flow rate measurement techniques employed by blower doors. The quantitative accuracy of existing air flow calibrations are not known and have been questioned. The blower doors considered in this report employ calibration formula relating the air flow rate through the door to the fan speed and the pressure difference across the door. Such fan speed calibrations must be done accurately over a wide range of fan speed/pressure difference combinations and in a physical setting that closely approximates the manner in which the blower doors are used in the field.

400,081

PB84-217413 PC A04/MF A01
National Bureau of Standards (NEL), Washington, DC.
Building Equipment Div.

Control Algorithms for Building Management and Control Systems -- Hot Deck/Cold Deck/Supply Air Reset, Day/Night Setback, Ventilation Purging, and Hot and Chilled Water Reset,
W. B. May, Jr. Mar 84, 75p NBSIR-84-2846

Sponsored in part by Department of Energy, Washington, DC. Office of Building and Community Systems, and Naval Civil Engineering Lab., Port Hueneme, CA.

Keywords: *Buildings, *Environmental engineering, Automatic control equipment, Air conditioning equipment, Ventilation, Heating equipment, Controller characteristics, Computer programs.

Software is an important component of building management and control systems (BMCS). This report describes concepts, algorithms, and software used in BMCS components developed in the NBS building systems and controls laboratory. The basic concepts, considerations and general algorithms for hot deck/cold deck supply air setpoint reset, day/night thermostat and ventilation setback, ventilation purging, and hot/chilled water supply setpoint reset are presented. Reset is the changing of a setpoint on a Heating, Ventilating and Air Conditioning (HVAC) system controlled by a feedback controller to match the system output to the system load. Setback is the changing of HVAC system operation to reduce energy use during unoccupied periods. Purging is the use of outdoor air during unoccupied periods to reduce mechanical conditioning requirements. Specific implementations of the algorithms in software on an actual BMCS are presented as examples.

400,082

PB84-217918 PC A06/MF A01
National Bureau of Standards (NEL), Washington, DC.
Center for Building Technology.

Effectiveness of Solar Shading for an Office Building,

Final rept.,
S. Treado, J. Barnett, and W. Remmert. May 84,
115p NBS/BSS-161

Also available from Supt. of Docs as SN003-003-02584-4. Library of Congress catalog card no. 84-601038. Sponsored in part by General Services Administration, Washington, DC., Naval Facilities Engineering Command, Alexandria, VA., Directorate of Civil Engineering (Air Force), Washington, DC. and Office of the Chief of Engineers (Army), Washington, DC.

Keywords: *Shades, *Commercial buildings, *Cooling, Solar radiation, Windows, Cost effectiveness, Savings, Computerized simulation, Heating, Performance evaluation, Climate, United States, *Solar screens, *Energy consumption.

The impact of solar shading of windows on building energy consumption, energy costs and occupant comfort is examined for a typical office building. Measurements of the solar and thermal performance characteristics of three solar screens are reported. Using the DOE-2 computer program, annual building energy simulations were performed for seven climatic locations in the United States. Thirteen combinations of window thermal transmittance and shading coefficient are ex-

amined for each location. The analysis includes separate evaluations for buildings with all-year cooling and summer-only cooling. The results indicate that solar shading can reduce building energy consumption and improve comfort conditions in buildings with significant cooling loads. The optimum shading device characteristics vary with climatic location.

400,083

PB84-218353 PC A04/MF A01
National Bureau of Standards (NEL), Washington, DC.
Center for Building Technology.

Offshore Concrete Structures in the Arctic: Research Needs.

Final rept.,
N. J. Carino. Apr 84, 56p NBS/TN-1192
Also available from Supt. of Docs as SN003-003-02582-8. Sponsored in part by Minerals Management Service, Reston, VA.

Keywords: *Concrete structures, *Offshore structures, *Arctic regions, Reviews, Meetings, Design, Materials, Construction, Inspection, Maintenance, Research.

A study of research needs to enhance the capability to design, maintain, and approve concrete offshore structures for the Arctic was carried out by the National Bureau of Standards on behalf of the Minerals Management Service, Department of the Interior. The study was composed of three activities: a letter survey of key individuals in the field; an international workshop on the subject; and a review of available literature. Data gathered from these activities were used to develop a comprehensive list of research needs in the following areas: design, materials, construction, inspection and repair.

400,084

PB84-218882 Not available NTIS
National Bureau of Standards, Washington, DC.

Structural Serviceability. Floor Vibrations.

Final rept.,
B. Ellingwood, and A. Tallin. Feb 84, 1p
Pub. in Jnl. of the Structural Engineers, v110 n2 p401-418 Feb 84.

Keywords: *Floors, *Deflection, *Vibration, Dynamic response, Structural design, Motion, Stiffness, Mathematical models, Humans, Acceptability, Reprints.

Floor vibrations arising from normal human activity may affect the serviceability of modern building structures, which are becoming lighter and more flexible than before. Existing serviceability criteria for floors are reviewed in the light of research dealing with human perception of structural motion. The dynamic response of floors to realistic pedestrian movement excitation models is analyzed. Tentative serviceability criteria to minimize floor vibrations that are objectionable to building occupants are presented.

400,085

PB84-221258 Not available NTIS
National Bureau of Standards, Washington, DC.

CIB (Conseil International du Batiment) National Committees as a Mechanism for Communication: An Example.

Final rept.,
N. J. Raufaste. May 84, 7p
Pub. in Proceedings of Build, Take Care What We Have Built With Limited Resources, Conseil International du Batiment 83, held at Stockholm, Sweden on August 15-19, 1983, paper on Making Use of Building Research 5, p355-361 May 83.

Keywords: *Communications, *Buildings, Assessments, Technology.

An example is given of the use of a National Committee as a mechanism to link a nation's building community to CIB. The newly focused goals, objectives, and activities of the U.S. National Committee for CIB are presented. The rationale for these are related to the needs of the U.S. building community for more effective information exchange with the international building community and to the roles of CIB. During the past two years this National Committee has made improvements in its coordination among U.S. building researchers to form linkages for information exchange and to assess building technology needs on a national and international scale.

400,086
PB84-221365 Not available NTIS
 National Bureau of Standards, Washington, DC.
Probability-Based Loading Criteria for Codified Design.
 Final rept.,
 B. Ellingwood. 1983, 12p
 Pub. in Proceedings of Int. Conf. for Application Statistics Probabilities Soil Structural Engineering (4th) held at Florence, Italy on June 13-17, 1983, p237-248 1983.

Keywords: *Building codes, *Loads(Forces), Safety, Design standards, Design criteria, Regulations.

Traditional structural design criteria lack consistency in the levels of safety and serviceability they accord different structures. Considerable improvements have been obtained recently using the unifying concept of limit states design along with a probabilistic approach to treating uncertainties invariably found in engineering practice. The paper describes some of these recent developments, illustrating how reliability-related research can be transformed into safety and serviceability criteria in codes and other regulatory documents.

400,087
PB84-221456 Not available NTIS
 National Bureau of Standards, Washington, DC.
Probability-Based Wind Load Description for Cladding and Structural Members Sensitive to Wind Direction Effects: A Survey of Recent Research.
 Final rept.,
 E. Simiu. 1983, 8p
 Pub. in Proceedings of International Conference on Application Statistics Probability Soil Structural Engineering held at Florence, Italy on June 13-17, 1983, p273-280.

Keywords: *Meetings, *Buildings, Loads(Forces), Design, Wind(Meteorology), Risk, Aerodynamics, Structural members, Probability, *Wind loads.

A review is presented of procedures for describing wind loads in both well-behaved and hurricane-prone regions. In addition, recent research is described pertaining to the risk-consistent design of wind-sensitive structures with both specified and unknown orientation.

400,088
PB84-221944 Not available NTIS
 National Bureau of Standards, Washington, DC.
Turbulent Wind Effects on Tension Leg Platform Surge.
 Final rept.,
 E. Simiu, and S. D. Leigh. Apr 84, 18p
 See also PB83-207464. Sponsored in part by Minerals Management Service, Reston, VA.
 Pub. in Jnl. of Structural Eng. 110, n4 p785-802 Apr 84.

Keywords: *Offshore structures, *Platforms, Structural engineering, Wind(Meteorology), Turbulence, Aerodynamics, Hydrodynamics, Reprints, *Wind loads.

A procedure is presented for estimating surge response to turbulent wind in the presence of current and waves. The procedure accounts for the nonlinearity of the hydrodynamic forces and for the coupling of aerodynamic and hydrodynamic effects. It is shown that current wind spectra do not model correctly the wind speed fluctuations at very low frequencies and an alternative model of the wind spectrum, consistent with fundamental principles, is presented. The equation of surge motion under turbulent wind in the presence of current and waves is solved for a typical tension leg platform and it is shown that the damping provided by the hydrodynamic forces precludes the occurrence of significant wind-induced resonant amplification effects even if the drag coefficient in the Morison equation is very small.

400,089
PB84-222249 PC A07/MF A01
 National Bureau of Standards (NEL), Washington, DC.
 Center for Building Technology.
Building Technology Project Summaries, 1983-1984 (of the National Bureau of Standards (NEL) Center for Building Technology).
 Final rept.,
 N. J. Raufaste, and M. Olmert. Jun 84, 141p NBS/SP-446-8
 See also PB83-259622.

Keywords: *Construction industry, *Buildings, *Research projects, Structural engineering, Building codes, Earthquake resistant structures, Structural design, Environmental engineering, Technology innovation, Solar energy concentrators, Cost effectiveness, Quality assurance, Construction materials, Thermal insulation, Acoustics, Earthquake engineering, Energy conservation, Cement hydration.

The Center for Building Technology (CBT) of the National Bureau of Standards (NBS) is the national building research laboratory. It works cooperatively with other organizations, private and public, to improve building practices. It conducts laboratory, field, and analytical research. It develops technologies to predict, measure, and test the performance of building materials, components, systems, and practices. This knowledge is required for responsible and cost-effective decisions in the building process and cannot be obtained through proprietary research and development. CBT provides technologies needed by the building community to achieve the benefits of advanced computation and automation. CBT does not promulgate building standards or regulations, but its technologies are widely used in the building industry and adopted by governmental and private organizations that have standards and codes responsibilities. CBT programs include: computer-integrated construction, structural safety, earthquake hazards reduction, building physics, building equipment, quality of building materials, and cement hydration.

400,090
PB84-223262 Not available NTIS
 National Bureau of Standards, Washington, DC.
Conduction Transfer Functions and the Heat Balance Method for Thermal Simulation of Multiroom Buildings.
 Final rept.,
 T. Kusuda, and G. N. Walton. 1983, 178p
 Pub. in Proceedings of Thermal Mass Effects Buildings, Oak Ridge National Laboratory, Knoxville, TN, June 2-3, 1982, COF-8206130, p99-176 1983.

Keywords: *Buildings, *Heat balance, Finite element analysis, Finite difference theory, Heat transfer, Air circulation, Time dependence.

Methods for modeling thermal mass are reviewed: finite difference and finite element techniques, recent developments in time domain and frequency domain conduction transfer functions, and a new analytic solution for three dimensional heat transfer in a slab-on-grade configuration. Convective and radiative processes which thermally connect the building masses with the room air and each other are briefly discussed. The equations for single and multiroom energy balances are described. These include new methods for inter-room air movement. A set of sample calculations are presented to show the influence of various simulation methods, particularly as they relate to multiroom analysis, on comfort and energy use.

400,091
PB84-226117 Not available NTIS
 National Bureau of Standards, Washington, DC.
Tether Deformation and Tension Leg Platform Surge.
 Final rept.,
 E. Simiu, and A. Carasso. Jun 84, 4p
 Sponsored in part by Minerals Management Service, Reston, VA.
 Pub. in Jnl. of Structural Engineers, v110 n6 p1419-1422 Jun 84.

Keywords: *Offshore structures, *Platforms, Loads(Forces), Hydrodynamics, Waves, Structural engineering, Dynamic structural analysis, Reprints.

A preliminary numerical investigation is conducted into the question whether tether deformation under the action of hydrodynamic loads can affect the surge response of tension leg platforms (TLP's). The motion of the tethers subjected to a forced oscillation at the platform level is represented by a nonlinear wave equation. The numerical solution of this equation showed that the lateral deformation of the tethers had no significant effect on the surge of deep water TLPs investigated in this note.

400,092
PB84-237197 PC A05/MF A01
 National Bureau of Standards (NEL), Washington, DC.
 Center for Building Technology.
Building Technology Publications, Supplement 8: 1983.
 Final rept.,
 L. Beavers. Jun 84, 92p NBS/SP-457/8
 Also available from Supt. of Docs as SN003-003-02600-0. See also PB83-250241.

Keywords: *Abstracts, *Construction industry, Buildings, Technology, Structural engineering, Structural design, Solar energy, Construction materials, Bibliographies, *Energy conservation, *Earthquake engineering.

This report presents NBS' Center for Building Technology (CBT) publications for 1983. It is the eighth supplement to NBS Special Publication 457, Building Technology Publications, and lists CBT reports issued during January 1 - December 31, 1983. It includes titles and abstracts of each CBT publication and those papers published in non-NBS media, key word and author indexes, and general information and instructions on how to order CBT publications. This document is divided into three main sections. The first, Titles and Abstracts, provides the report title, author(s), date of publication, selected key words, and an abstract of each NBS publication and each paper published in an outside source. The Author Index cites CBT authors and their publication number which is listed in this supplement. The Key Word Index is a subject index, listing word summaries of the building research topics for each publication and paper. By selecting a main word or subject, the user is able to locate reports of interest through these subject-related words.

400,093
PB84-241728 PC A04/MF A01
 National Bureau of Standards (NEL), Washington, DC.
 Center for Building Technology.
Weatherization of Residences: Criteria for Retrofit Materials and Products.
 Technical note,
 W. J. Rossiter, Jr., and R. G. Mathey. Aug 84, 72p NBS/TN-1201
 Sponsored in part by Department of Energy, Washington, DC. Also available from Supt. of Docs as SN003-003-02599-2.

Keywords: *Weatherproofing, *Houses, Materials, Thermal insulation, Storm windows, Doors, Weatherstripping, Thermostats, Fire safety, Energy conservation.

Criteria are given for retrofit materials and products included in the DOE Weatherization Assistance Program. These materials and products are thermal insulation, storm windows and doors, replacement windows and doors, caulks and sealants, weatherstripping, vapor retarders, clock thermostats, and replacement glazing. The criteria are based on a consideration of factors such as thermal performance, fire safety, durability, quality, conformance to building codes, use, and ease of installation. The retrofit materials and products are listed by generic type along with pertinent standards and specifications. Precautions to be followed during their insulation are also given for each of the items. Fire safety requirements for thermal insulations are recommended with regard to the use and locations where they are installed.

400,094
PB85-106839 PC A03/MF A01
 National Bureau of Standards (NEL), Washington, DC.
 Structures Div.
Construction Research in Japan,
 H. S. Lew. Sep 84, 28p NBSIR-84/2834

Keywords: *Construction industry, *Research, Construction equipment, Laboratories, Development, Japan, Trends, Public works.

The construction industry is one of the key industries in Japan. The annual volume of business of the industry accounts for over 20 percent of the GNP of Japan. Partially due to large investments in the public works projects by the Japanese Government, the industry maintained a steady growth during the past two decades. During this period of steady growth, many large construction firms established research laboratories to

place themselves in a favorable position in the domestic, as well as international, construction market. The construction machinery industry of Japan also grew steadily during the same period, and their share of the world market increased significantly. In order to meet foreign competition, the industry has also made significant investments in their research and development efforts. This report examines the research and development efforts of Japan's construction and construction machinery industries and their trends.

400,095

PB85-123651 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Reliability Based Criteria for Reinforced Concrete Design.
Final rept.,
B. Ellingwood. 1979, 15p
Pub. in American Society of Civil Engineers Jnl. Struct. Div. 105, n4 p713-727, 4 Apr 79.

Keywords: *Reinforced concrete, *Buildings, *Design criteria, Reliability, Construction materials, Design standards, Resistance, Loads(Forces), Structural engineering, Probability theory, Reprints.

Probabilistic limit states design concepts have evolved over the past decade because of the potential that they afford for simplifying the design process and placing it on a consistent basis for various construction materials. Several different criteria formats have been proposed, which have the common feature that their various load and resistance factors have a reliability basis. Two such criteria for reinforced concrete design are examined in this paper. The development of practical reliability based design criteria is also illustrated. While these are consistent with appropriate measures of design uncertainty and reliability and have a well established rationale, they retain the simple characteristics of existing criteria with which designers in the US feel comfortable.

400,096

PB85-136232 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Statistical Tests of Environmental Load Data.
Final rept.,
B. Ellingwood. Jun 84, 5p
Pub. in Jnl. of Structural Engineers 110, n6 p1400-1404 Jun 84.

Keywords: *Structural design, *Climatology, Loads(Forces), Statistical tests, Snow, Wind pressure, Probability theory, Statistical analysis, Structural engineering, Reprints.

Basic climatological variables such as wind speed, ground snow and other environmental effects are needed to calculate structural design loads. The design loads are contingent on the selection of suitable probability distributions for these climatological variables. This note compares the probability plot correlation criteria as a tool for statistical analysis and testing of environmental data to other common methods as a tool for testing and analyzing environmental data.

400,097

PB85-137420 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Probability - Based Design for Engineered Masonry Construction.
Final rept.,
B. Ellingwood, and A. Tallin. Jan 84, 4p
Pub. in Proceedings of American Society of Civil Engineers, Specialty Conference on Probability Mechanics and Structural Reliability, Berkeley, CA., January 11-13, 1984, p82-85.

Keywords: *Masonry, *Construction, Buildings, Design, Structural engineering, Specifications, Probability theory, Criteria, Limits, Reliability, Walls, Loads(Forces).

Specifications for masonry and other construction materials are expected to move gradually over the next

several years toward the adoption of probability-based limit states design. This paper summarizes how such criteria might be developed for brick and concrete masonry construction using, as an example, walls loaded in combinations of axial compression and out-of-the-plane flexure.

400,098

PB85-140424 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
West Virginia Cooling Tower Collapse Caused by Premature Form Removal.
Final rept.,
H. S. Lew. 1980, 6p
Sponsored by Occupational Safety and Health Administration, Washington, DC.
Pub. in Civil Engineering 50, n2 p62-67 Feb 80.

Keywords: *Cooling towers, *Collapse, Failure, Loads(Forces), Stresses, Formwork(Construction), Concrete construction, Concretes, Shells(Structural forms), Reprints.

The collapse of the natural-draft hyperbolic concrete cooling tower unit no. 2 at the Pleasants Power Station at Willow Island, West Virginia was investigated by the National Bureau of Standards. The investigation included onsite inspections, laboratory tests of construction assembly components and concrete specimens, and analytical studies. Based on the results of these field, laboratory and analytical investigations, it was concluded that the most probable cause of the collapse was due to the imposition of construction loads on the shell before the concrete of lift 28 had gained adequate strength to support these loads. The analysis of the shell indicated that the collapse initiated at the part of the shell in lift 28 where cathead no. 4 was located. It further showed that calculated stress resultants at several points in that part equalled or exceeded the strength of the shell in compression, bending and shear.

400,099

PB85-144020 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Multidirectional Analysis of Extreme Wind Speed Data.
Final rept.,
E. Simiu, E. M. Hendrickson, W. A. Nolan, I. Olkin, and C. H. Spiegelman. Aug 84, 4p
Sponsored by National Science Foundation, Washington, DC.
Pub. in Proceedings of Engineering Mechanics Division Specialty Conference (5th), Laramie, WY., August 1-3, 1984, Eng. Mech. Civ. Eng. 2, p1196-1199 Aug 84.

Keywords: *Structural engineering, *Wind velocity, Directional measurement, Analysis(Mathematics), Wind pressure, Gust loads, Extreme-value problems.

An extended abstract is presented in which: (1) Existing methods for taking wind directionality into account in structural engineering calculations are reviewed; (2) A new such method is proposed; (3) It is shown that published data issued by the National Oceanic and Atmospheric Administration are sufficient to characterize the directional extreme wind climate.

400,100

PB85-144939 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Dynamic Response of Structural Systems Subjected to Horizontal Propagating Shear Waves.
Final rept.,
S. T. Wu, and E. V. Leyendecker. Jul 84, 8p
Pub. in Proceedings of World Conference on Earthquake Engineering (8th), San Francisco, CA., July 21-28, 1984, p355-362.

Keywords: *Dynamic structural analysis, Secondary waves, Seismic waves, Dynamic response, Structures, Eccentricity, Analysis(Mathematics), Building codes, Earthquake resistant structures, *Earthquake engineering, Case studies.

This paper presents the numerical results of a para-

metric study for structures subjected to shear horizontal propagating waves. Dynamic behavior of coupled lateral-torsional systems subjected to seismic excitations is investigated analytically. Case studies are provided to show the contribution of each of the selected parameters to the rotational response of the system. Dynamic eccentricity is selected as an index to represent the level of the response. The dynamic characteristics of the systems and motions are also discussed based on this proposed approach.

400,101

PB85-144947 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Some Statistical Aspects of Wind and Snow Loading.
Final rept.,
R. B. Corotis, and B. R. Ellingwood. Aug 84, 4p
Pub. in Proceedings of Engineering Mechanics Division Specialty Conference (5th), University of Wyoming, Laramie, WY., August 1-3, 1984, p1200-1203.

Keywords: *Structural engineering, *Snow, *Wind pressure, Loads(Forces), Statistical analysis, Structural design, Mathematical models, Building codes.

Economic loss due to natural hazards in the United States is well in excess of ten billion dollars a year. However, research into improved probabilistic modeling of these hazards, and structural advances to limit the loss, attract only relatively small support outside the earthquake engineering community. This paper discusses some particular probabilistic modeling aspects of two widespread hazards; wind and snow.

400,102

PB84-216985 Not available NTIS
National Bureau of Standards, Washington, DC.
Use of 'Corner Microphones' for Sound Power Measurements in a Reverberation Chamber.
Final rept.,
T. W. Bartel, S. L. Yaniv, and D. R. Flynn. Dec 83, 7p
Pub. in Jnl. of the Acoustical Society of America, v74 n 6 p1794-1800 Dec 83.

Keywords: *Acoustic measurement, Reverberation, Test chambers, Microphones, Power measurement, Reprints.

A comparison was made between acoustic measurements conducted with microphones mounted in the trihedral corners of the 425-m³ NBS reverberation chamber and similar measurements using microphones located in the room interior, away from the room boundaries. Measurements of broad-band and discrete-frequency sound pressure and of reverberation time were included.

400,103

PB84-217462 PC A03/MF A01
National Bureau of Standards (NEL), Washington, DC.
Center for Building Technology.
NBS (National Bureau of Standards) Tri-Directional Test Facility,
K. Woodward, and F. Rankin. May 84, 45p NBSIR-84-2879

Keywords: *Structural analysis, *Buildings, *Earthquake resistant structures, *Test facilities, Loads(Forces), Hydraulic servomechanisms, Actuators, Lateral pressure, Computer applications.

A general description of a unique structural testing apparatus is presented. The apparatus is called the NBS Tri-directional Test Facility (NBS/TTF). The NBS/TTF can subject large structural elements to a wide variety of three-dimensional loadings including both translations and rotations in three orthogonal directions. The facility is computer based with all aspects of data acquisition, reduction, and display coordinated and controlled by a minicomputer. The minicomputer also controls the loading of test specimens as directed by the operator. The loads are applied by a closed-loop hydraulic system having seven independently servo-controlled hydraulic actuators. Test specimens having dimensions as large as 3 m long by 3 m deep by 3.5 m high may be installed and tested in the facility. Lateral forces of up to + or - 900 kN may be imposed on the test specimen in combination with vertical forces of up to + or - 1800 kN.

400,104

PB85-100451 PC A05/MF A01
National Bureau of Standards (NEL), Washington, DC.
Building Equipment Div.
National Bureau of Standards Passive Solar Test Facility - Instrumentation and Site Handbook,
B. M. Mahajan. Aug 84, 89p NBSIR-84/2911
Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Test facilities, *Solar energy, Detectors, Passive systems.

This handbook provides a complete description of the test building, thermophysical properties of the building material, location of the sensors installed at the test facility, and data acquisition system and procedures.

400,105

PB85-110427 PC A04/MF A01
National Bureau of Standards (NEL), Washington, DC.
Building Equipment Div.
Test Methods for the Direct Measurement of Stack Energy Loss during the Off-Period of Space Heating Equipment,
E. Kweller, and R. A. Wise. Sep 84, 66p NBSIR-84/2869
Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Space heating, Gas heating, Tests, Energy dissipation, Flues, Thermal measurements, Thermal efficiency, Heat loss, Simulation.

Evaluations have been made of a possible alternative to the tracer gas test method now being used to measure off-period energy loss of space heating equipment with vent dampers. This alternative method offers the potential of a direct measurement method without the need for expensive tracer gas type instrumentation. The method uses a controlled flow of gas to a small gas fueled burner to simulate normal flue or stack temperatures previously measured during a cool-down test. Energy metered through the gas burner during the simulation gives a direct measurement of the thermal energy losses out of the stack. Results in comparison with the tracer gas method of test were lower for off-period energy loss measurements. A trend to better agreement between the two methods was noticeable for test furnaces with greater fuel input rates. Further development testing and evaluation will be required before the simulation can be considered as an acceptable alternative test method.

400,106

PB85-119345 PC A04/MF A01
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Thermal Performance Testing of Passive Solar Components in the NBS (National Bureau of Standards) Calorimeter,
M. E. McCabe, C. E. Hancock, and M. Van Migom. Aug 84, 71p NBSIR-84/2920
Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Calorimeters, *Thermal measurements, Tests, Components, Performance, Windows, Solar energy, Test facilities, Walls, Passive solar heating systems, Passive solar cooling systems, Solar collectors, Shutters.

Studies of the thermal performance of passive solar buildings have indicated a need for precise measurement of solar heat gain and thermal heat loss or gain for modular passive/hybrid solar components in the outdoor environment. A description of the design, calibration, and initial operational results for a new calorimetric test facility designed to perform these measurements is presented in this report. The test facility is located at the National Bureau of Standards in Gaithersburg, MD, and it is anticipated that it will provide a substantial improvement in the measuring techniques for passive and hybrid solar components over the field test cells currently in use. Thermal performance data were taken for four passive solar test articles during

the winter of 1982-1983, including two windows and two collector storage walls. Test results are correlated as U-values and Shading Coefficients for the two windows.

400,107

PB85-136810 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Wind Tunnels Applied to Wind Engineering in Japan.
Final rept.,
R. D. Marshall. Jun 84, 19p
Pub. in Jnl. of Structural Engineers 110, n6 p1203-1221 Jun 84.

Keywords: *Wind tunnels, Aerodynamics, Boundary layer, Research management, Test facilities, Engineering, Dimensions, Performance evaluation, Reprints.

Many large boundary layer wind tunnels have been commissioned in Japan over the past 10 years, giving Japan a commanding lead in this area of technology. Some reasons for this extensive building program include the recent concentration of government research institutes at Tsukuba, the increased emphasis on structural and bridge engineering by the heavy industry companies, and the emphasis placed on research by Japanese construction corporations. In general, Japanese universities have not been able to keep pace with the government and private sectors in providing their engineering laboratories with modern and expensive research facilities. Nevertheless, much of the new and exciting work in wind engineering is being done by the universities. The very substantial investment made in boundary layer wind tunnels over the past two years suggests that Japanese heavy industries and construction corporations see a bright future for wind engineering. It is concluded that a significant penetration of the U.S. market for specialized engineering services is likely to occur within the next few years. The paper presents basic dimensions and performance characteristics for several wind tunnels and four new boundary layer wind tunnels are described in detail.

400,108

PB85-108611 Not available NTIS
National Bureau of Standards, Washington, DC.
Tornado-Borne Missile Speed Probabilities.
Final rept.,
E. Simiu, and M. R. Cordes. Jan 83, 15p
Sponsored in part by Nuclear Regulatory Commission, Washington, DC.
Pub. in Jnl. of Structural Engineers 109, n1 p154-168 Jan 83.

Keywords: *Nuclear power plants, Velocity, Estimates, Tornadoes, Missiles, Probability theory, Reprints, Computer applications.

A procedure is developed for estimating speeds with which postulated missiles hit any given set of targets in a nuclear power plant or similar installation. Hit speeds corresponding to probabilities of occurrence are calculated for a given nuclear power plant under various assumptions concerning the magnitude of the force opposing missile takeoff, direction of tornado axis of translation, number and location of missiles, and size of target area.

400,109

PB84-227040 Not available NTIS
National Bureau of Standards, Washington, DC.
Line Source and Site Characterizations for Defining the Sound Transmission Loss of Building Facades.
Final rept.,
F. F. Rudder, Jr. Mar 83, 22p
Pub. in Jnl. of Sound and Vibration, v91 n3 p403-424 Mar 83.

Keywords: *Buildings, *Sound transmission, Noise(Sound), Reprints, *Acoustic attenuation.

An analytical model is presented for defining the sound transmission loss of building facades exposed to noise

from line sources. The model describes the non-diffruse sound field incident upon the facade in terms of both source and site parameters. The effects of facade orientation relative to the line source and the sound propagation with distance are introduced as a single term in the definition of the facade sound transmission loss. This term defines a mean angle of incidence for the exterior sound field that is equivalent to a point source location relative to a point on the facade. Numerical results are presented estimating the magnitude of these effects and it is shown that alternate methods for conducting field measurements of building facade sound transmission loss may be related using this model.

400,110

PB85-145381 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Choosing Among Intense Acoustic Background Stimuli - Acoustic Menu.
Final rept.,
G. A. Zerdy, and J. A. Molino. 1974, 1p
Pub. in Jnl. of the Acoustical Society of America 56, n8 64p 1974.

Keywords: *Noise(Sound), *Acoustics, *Stimulus(Psychophysiology), Loudness, Noise pollution, Responses, Frequencies, Human behavior, Reprints, Preferences.

Preferential relations among acoustic stimuli were determined for human subjects by a procedure that employed no verbal descriptions of the stimuli. Stimuli were presented in pairs to subjects as they studied Russian on a teaching machine. Thirteen different subjects were employed in each of two experiments. They were instructed that they could 'change the sounds that you hear' by pressing a telegraph key. Each key press switched the acoustic background from the current to the alternate member of a stimulus pair. The pair member presented was alternated periodically independently of the subjects' responses. The stimuli were four pure tones (125, 1000, 4000, and 8000 Hz at A-weighted sound levels ranging from 90 - 112 dB) and a low-level white noise. The proportion of time which subjects spent in the acoustic background stimuli varied significantly as a function of frequency even though equivalent A-weighted sound levels were presented. This finding suggests that A-weighting the sound levels does not accurately describe the preference (indifference) relationships among the stimuli employed.

PERSONAL AUTHOR INDEX

Personal Author Index

- AGGOUR, M. S.**
Size Effect in Simple Shear Testing,
PB85-137719 400,012
- ALIBE, B.**
Practical Approximations of Peak Wave Forces,
PB85-138592 400,010
- AMER, M. I.**
Size Effect in Simple Shear Testing,
PB85-137719 400,012
- ARENS, E.**
Influence of Degree Day Base Temperature on Building
Energy Prediction.
PB85-120715 400,022
- ARENS, E. A.**
Climate Data Abbreviation for the Computerised Calculation
of Heating and Cooling Requirements in Buildings.
PB85-145407 400,048
- BAKER, D. W.**
On-Site Calibration of Flow Metering Systems Installed in
Buildings.
PB84-160993 400,074
- BARNETT, J.**
Effectiveness of Solar Shading for an Office Building.
PB84-217918 400,082
- BARTEL, T. W.**
Use of 'Corner Microphones' for Sound Power Measure-
ments in a Reverberation Chamber.
PB84-216985 400,102
- BEAN, J.**
NBS (National Bureau of Standards) Daylight Availability
Database,
PB84-245745 400,005
- BEAN, J. W.**
Simplified Methods for Determining Seasonal Heat Loss
from Uninsulated Slab-on-Grade Floors.
PB84-221621 400,033
- BEAUSOLIEL, R. W.**
Effects of Thermal Insulation Penetrating Electrical Boxes.
PB84-239334 400,015
- BEAVERS, L.**
Building Technology Publications, Supplement 8: 1983.
PB84-237197 400,092
- BROWN, P.**
Evaluation of the Sulfate Resistance of Cements in a Con-
trolled Environment.
PB85-123628 400,064
- BROWN, P. W.**
Modular Data Acquisition and Display Software System for
a Laboratory Environment.
PB84-217892 400,013
- BROWN, P. W.**
Evaluation of Ettringite and Related Compounds for Use in
Solar Energy Storage.
PB85-146876 400,025
- BURNS, P. J.**
Uses of Waste Materials and By-Products in Construction.
PB85-142339 400,068
- BURNS, P. J.**
Thickness Effect in Low-Density Insulation,
PB85-163376 400,051
- CAMPBELL, P. G.**
Performance Criteria for Restoration Coatings for Porcelain
Enamel Surfaces,
PB84-141787 400,026
- CARASSO, A.**
Tether Deformation and Tension Leg Platform Surge.
PB84-226117 400,091
- CARINO, N. J.**
Comparison of Analytical with Experimental Internal Strain
Distribution for the Pullout Test.
PB84-221969 400,056
- CARINO, N. J.**
Deformation and Failure in Large-Scale Pullout Tests.
PB84-221977 400,057
- CARINO, N. J.**
Investigation of East Chicago Ramp Collapse.
PB84-227404 400,055
- CARINO, N. J.**
Laboratory Study of Flaw Detection in Concrete by the
Pulse-Echo Method.
PB85-141505 400,067
- CARINO, N. J.**
Offshore Concrete Structures in the Arctic: Research
Needs.
PB84-218353 400,083
- CARINO, N. J.**
Pulse-Echo Method for Flaw Detection in Concrete.
PB84-234509 400,060
- CARINO, N. J.**
Responses to Questions by the General Accounting Office
Related to Construction of the Sunshine Skyway Bridge.
PB84-218072 400,053
- CHANG, Y. L.**
Comparative Analysis of Thermographic Inspections Per-
formed on Retrofitted Homes,
PB84-142231 400,072
- CHANG, Y. M. L.**
Thermographic Inspection of Exterior Wall Insulation Retro-
fits.
PB85-102788 400,041
- CHANGERY, M. J.**
Directional Extreme Wind Speed Data for the Design of
Buildings and Other Structures.
PB84-178847 400,077
- CLIFTON, J. R.**
Effects of Thermal Insulation Penetrating Electrical Boxes.
PB84-239334 400,015
- CLIFTON, J. R.**
Impact Resistance of Concrete.
PB84-229491 400,058
- CLIFTON, J. R.**
Mechanical Performance Model for Roofing Membranes.
PB85-129401 400,065
- CLIFTON, J. R.**
Uses of Waste Materials and By-Products in Construction.
PB85-142339 400,068
- COLLINS, B. L.**
Role of Color in Lighting for Meat and Poultry Inspection,
PB84-177823 400,009
- COLLINS, B. L.**
Test Methods and Standards Development for Active Solar
Heating and Cooling Systems.
PB84-217447 400,032
- COLLINS, B. L.**
Use of Hazard Pictorials/Symbols in the Minerals Industry.
PB84-165877 400,011
- CONOVER, D. R.**
Status of Building Code Provisions for Solar Energy Sys-
tems.
PB84-171610 400,075
- CORDES, M. R.**
Tornado-Borne Missile Speed Probabilities.
PB85-108611 400,108
- COROTIS, R. B.**
Some Statistical Aspects of Wind and Snow Loading.
PB85-144947 400,101
- DIDION, D.**
Laboratory Evaluation of the Steady-State and Part Load
Performance of Absorption Type Heating and Cooling
Equipment,
PB84-182146 400,031
- DIDION, D.**
Test Procedures for Rating Residential Heating and Cooling
Absorption Equipment,
PB84-216514 400,078
- DIDION, D. A.**
Experimental Evaluation of Engine-Driven Heat Pump Sys-
tems.
PB85-120657 400,044
- DIKKERS, R. D.**
Research Priorities for Improving the Effectiveness of
Active Solar Hot Water and Space Conditioning Systems.
PB85-153443 400,050
- DUMITRIU-VALCEA, E. J.**
Directional Extreme Wind Speed Data for the Design of
Buildings and Other Structures.
PB84-178847 400,077
- ELLINGWOOD, B.**
Probability - Based Design for Engineered Masonry Con-
struction.
PB85-137420 400,097
- ELLINGWOOD, B.**
Probability-Based Loading Criteria for Codified Design.
PB84-221365 400,086
- ELLINGWOOD, B.**
Reliability Based Criteria for Reinforced Concrete Design.
PB85-123651 400,095
- ELLINGWOOD, B.**
Statistical Tests of Environmental Load Data.
PB85-136232 400,096
- ELLINGWOOD, B.**
Structural Serviceability. Floor Vibrations.
PB84-218882 400,084
- ELLINGWOOD, B. R.**
Some Statistical Aspects of Wind and Snow Loading.
PB85-144947 400,101
- FAISON, T. K.**
Air Quality Criteria for Storage of Paper-Based Archival
Records,
PB84-135607 400,029
- FLYNN, D. R.**
Use of 'Corner Microphones' for Sound Power Measure-
ments in a Reverberation Chamber.
PB84-216985 400,102
- FROHNSDORFF, G.**
Uses of Waste Materials and By-Products in Construction.
PB85-142339 400,068
- GALOWIN, L. S.**
Criteria for Mechanical Systems in Multifamily Buildings for
Residential Weatherization Options,
PB85-120129 400,043
- GALOWIN, L. S.**
Field Hydraulic Performance of One- and Two-Story Resi-
dential Plumbing Systems with Reduced-Size Vents,
PB85-131878 400,070
- GERGELEY, P.**
Wind-Tunnel Study of Wind Loading on a Compliant Off-
shore Platform,
PB84-216522 400,079
- GILLETTE, G.**
Daylighting Computation Procedure for Use in DOE-2 and
Other Dynamic Building Energy Analysis Programs.
PB84-246032 400,040
- GILLETTE, G.**
Measurements of Sky Luminance, Sky Illuminance, and
Horizontal Solar Radiation.
PB85-145423 400,003
- GILLETTE, G.**
NBS (National Bureau of Standards) Daylight Availability
Database,
PB84-245745 400,005
- GILLETTE, G. L.**
Effective Use of Daylighting.
PB84-221985 400,034
- GREENBERG, J.**
Multi-Year Plan for Experimental Systems Research-Pas-
sive and Hybrid Solar Energy Program,
PB85-146868 400,023
- GREENBERG, J.**
Phase Change Thermal Energy Storage and the Model
Building Codes.
PB85-111201 400,024
- GRIGORIU, M.**
Practical Approximations of Peak Wave Forces,
PB85-138592 400,010
- GRIGORIU, M.**
Wind-Tunnel Study of Wind Loading on a Compliant Off-
shore Platform,
PB84-216522 400,079
- GRIMES, J.**
Modular Data Acquisition and Display Software System for
a Laboratory Environment.
PB84-217892 400,013
- GROT, R. A.**
Comparative Analysis of Thermographic Inspections Per-
formed on Retrofitted Homes,
PB84-142231 400,072
- GROT, R. A.**
Thermographic Inspection of Exterior Wall Insulation Retro-
fits.
PB85-102788 400,041
- HANCOCK, C. E.**
Thermal Performance Testing of Passive Solar Compo-
nents in the NBS (National Bureau of Standards) Calorime-
ter,
PB85-119345 400,106
- HARRIS, J. E.**
Test Results and a Recommended Test Procedure for Heat
Traps,
PB84-241496 400,038
- HENDRICKSON, E. M.**
Multidirectional Analysis of Extreme Wind Speed Data.
PB85-144020 400,099
- HENDRICKSON, E. M.**
Ring-on-Ring Tests and Load Capacity of Cladding Glass.
PB85-106391 400,061
- HURLEY, C. W.**
Calibration of Temperature Measurement Systems Installed
in Buildings.
PB84-154004 400,030
- HURLEY, C. W.**
On-Site Calibration of Flow Metering Systems Installed in
Buildings.
PB84-160993 400,074
- HUSTON, W.**
Research Priorities for Improving the Effectiveness of
Active Solar Hot Water and Space Conditioning Systems.
PB85-153443 400,050
- JOHNSON, W. B.**
Air Quality Criteria for Storage of Paper-Based Archival
Records,
PB84-135607 400,029
- KAETZEL, L.**
Modular Data Acquisition and Display Software System for
a Laboratory Environment.
PB84-217892 400,013
- KAO, J. Y.**
Economizer Algorithms for Energy Management and Con-
trol Systems,
PB84-178284 400,076
- KAO, J. Y.**
Strategies for Energy Conservation for a School Building.
PB84-224302 400,035
- KELLY, G. E.**
Economizer Algorithms for Energy Management and Con-
trol Systems,
PB84-178284 400,076
- KENNISH, W. J.**
Research Priorities for Improving the Effectiveness of
Active Solar Hot Water and Space Conditioning Systems.
PB85-153443 400,050
- KLEIN, S.**
Laboratory Evaluation of the Steady-State and Part Load
Performance of Absorption Type Heating and Cooling
Equipment,
PB84-182146 400,031
- KNAB, L.**
Selection, Procurement, and Description of Salem Lime-
stone Samples Used to Study the Effects of Acid Rain,
PB84-231067 400,059

KNAB, L. I.		
Impact Resistance of Concrete.		
PB84-229491	400,058	
Procedure for Tristimulus Color Measurements on Building Stone.		
PB85-133981	400,066	
KOVACS, W. D.		
Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities.		
PB85-121465	400,007	
Size Effect in Simple Shear Testing.		
PB85-137719	400,012	
KUSUDA, T.		
Conduction Transfer Functions and the Heat Balance Method for Thermal Simulation of Multiroom Buildings.		
PB84-223262	400,090	
Daylighting Computation Procedure for Use in DOE-2 and Other Dynamic Building Energy Analysis Programs.		
PB84-246032	400,040	
Simplified Methods for Determining Seasonal Heat Loss from Uninsulated Slab-on-Grade Floors.		
PB84-221621	400,033	
KWELLER, E.		
Performance and Selection Criteria for Mechanical Energy Saving Retrofit Options for Single-Family Residences.		
PB84-226075	400,037	
Procedures for Determining Annual Efficiency for Furnaces and Vented Household Heaters with Modulating-Type Controls.		
PB84-243997	400,039	
Test Methods for the Direct Measurement of Stack Energy Loss during the Off-Period of Space Heating Equipment.		
PB85-110427	400,105	
LEIGH, S. D.		
Turbulent Wind Effects on Tension Leg Platform Surge.		
PB84-221944	400,088	
LEISS, J. S.		
Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities.		
PB85-121465	400,007	
LEW, H. S.		
Construction Research in Japan.		
PB85-106839	400,094	
Criteria for Assuring Safety during Erection of Concrete Shell Structures.		
PB85-118388	400,071	
Investigation of East Chicago Ramp Collapse.		
PB84-227404	400,055	
Prediccion de la Resistencia del Concreto a Partir de su Madurez (Method for Prediction of Strength and Resistance of Concrete Based on the Maturity Concept).		
PB85-115558	400,062	
West Virginia Cooling Tower Collapse Caused by Premature Form Removal.		
PB85-140424	400,098	
LEYENDECKER, E. V.		
Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities.		
PB85-121465	400,007	
Dynamic Response of Structural Systems Subjected to Horizontal Propagating Shear Waves.		
PB85-144939	400,100	
LISTER, L. A.		
Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities.		
PB85-121465	400,007	
LIU, S. T.		
Performances of Different Passive Solar Systems at the NBS (National Bureau of Standards) Test Facility.		
PB85-141430	400,045	
MAHAJAN, B. M.		
National Bureau of Standards Passive Solar Test Facility - Instrumentation and Site Handbook.		
PB85-100451	400,104	
Performances of Different Passive Solar Systems at the NBS (National Bureau of Standards) Test Facility.		
PB85-141430	400,045	
Short Duration Winter-Time Performances of Different Passive Solar Systems.		
PB85-163392	400,052	
MARSHALL, R. D.		
Fastest-Mile Wind Speeds in Hurricane Alicia.		
PB84-220771	400,004	
Wind Tunnels Applied to Wind Engineering in Japan.		
PB85-136810	400,107	
MARTIN, J. W.		
Nondestructive Corrosion Detection Under Organic Films Using Infrared Thermography.		
PB84-225416	400,027	
Ring-on-Ring Tests and Load Capacity of Cladding Glass.		
PB85-106391	400,061	
MASTERS, L. W.		
Optical-Properties of Black Chrome - A Model for Predicting the Effect of Exposure to Elevated Temperature.		
PB85-142784	400,028	
MATHEY, R. G.		
Air Quality Criteria for Storage of Paper-Based Archival Records.		
PB84-135607	400,029	
Mechanical Performance Model for Roofing Membranes.		
PB85-129401	400,065	
Weatherization of Residences: Criteria for Retrofit Materials and Products.		
PB84-241728	400,093	
MAXWELL, B. R.		
Experimental Evaluation of Engine-Driven Heat Pump Systems.		
PB85-120657	400,044	
MAY, W. B. JR.		
Control Algorithms for Building Management and Control Systems - Hot Deck/Cold Deck/Supply Air Reset, Day/Night Setback, Ventilation Purging, and Hot and Chilled Water Reset.		
PB84-217413	400,081	
MCCABE, M. E.		
Thermal Performance Testing of Passive Solar Components in the NBS (National Bureau of Standards) Calorimeter.		
PB85-119345	400,106	
MCKNIGHT, M. E.		
Nondestructive Corrosion Detection Under Organic Films Using Infrared Thermography.		
PB84-225416	400,027	
MCLINDEN, M.		
Laboratory Evaluation of the Steady-State and Part Load Performance of Absorption Type Heating and Cooling Equipment.		
PB84-182146	400,031	
MCNALL, P. E.		
Impact of Building Codes and Regulations on Indoor Air Quality.		
PB85-144905	400,047	
Ventilation Concepts for Office Buildings.		
PB85-151561	400,049	
MEESE, W. J.		
Effects of Thermal Insulation Penetrating Electrical Boxes.		
PB84-239334	400,015	
MOLINO, J. A.		
Choosing Among Intense Acoustic Background Stimuli - Acoustic Menu.		
PB85-145381	400,110	
MORREALE, T. A.		
Wind-Tunnel Study of Wind Loading on a Compliant Off-shore Platform.		
PB84-216522	400,079	
NALL, D.		
Influence of Degree Day Base Temperature on Building Energy Prediction.		
PB85-120715	400,022	
NALL, D. H.		
Climate Data Abbreviation for the Computerized Calculation of Heating and Cooling Requirements in Buildings.		
PB85-145407	400,048	
NOLAN, W. A.		
Multidirectional Analysis of Extreme Wind Speed Data.		
PB85-144020	400,099	
OLKIN, I.		
Multidirectional Analysis of Extreme Wind Speed Data.		
PB85-144020	400,099	
OLMERT, M.		
Building Technology Project Summaries, 1983-1984 (of the National Bureau of Standards (NEL) Center for Building Technology).		
PB84-222249	400,089	
PARK, C.		
Demand Limiting Algorithms for Energy Management and Control Systems.		
PB84-167675	400,018	
Economizer Algorithms for Energy Management and Control Systems.		
PB84-178284	400,076	
PARSONS, F. C.		
Fortran 77 Computer Program for Test Procedure Calculations of Vented Heaters.		
PB85-109627	400,042	
PERSILY, A. K.		
Air Flow Calibration of Building Pressurization Devices.		
PB84-217025	400,080	
Ventilation Concepts for Office Buildings.		
PB85-151561	400,049	
PFRANG, E. O.		
Criteria for Assuring Safety during Erection of Concrete Shell Structures.		
PB85-118388	400,071	
POMMERSHEIM, J. M.		
Mechanical Performance Model for Roofing Membranes.		
PB85-129401	400,065	
RADERMACHER, R.		
Laboratory Evaluation of the Steady-State and Part Load Performance of Absorption Type Heating and Cooling Equipment.		
PB84-182146	400,031	
Test Procedures for Rating Residential Heating and Cooling Absorption Equipment.		
PB84-216514	400,078	
RANKIN, F.		
Influence of Vertical Compressive Stress on Shear Resistance of Concrete Block Masonry Walls.		
PB85-119337	400,063	
NBS (National Bureau of Standards) Tri-Directional Test Facility.		
PB84-217462	400,103	
RAUFASTE, N. J.		
Building Technology Project Summaries, 1983-1984 (of the National Bureau of Standards (NEL) Center for Building Technology).		
PB84-222249	400,089	
CIB (Conseil International du Batiment) National Committees as a Mechanism for Communication: An Example.		
PB84-221258	400,085	
REED, D. A.		
Probabilistic Design of Cladding Glass Subjected to Wind Loads.		
PB84-221712	400,002	
Ring-on-Ring Tests and Load Capacity of Cladding Glass.		
PB85-106391	400,061	
Wind Loading and Strength of Cladding Glass.		
PB84-221068	400,001	
REED, K. A.		
Performances of Different Passive Solar Systems at the NBS (National Bureau of Standards) Test Facility.		
PB85-141430	400,045	
REEDER, B. C.		
Phase Change Thermal Energy Storage and the Model Building Codes.		
PB85-111201	400,024	
REICHARD, T. W.		
Prediccion de la Resistencia del Concreto a Partir de su Madurez (Method for Prediction of Strength and Resistance of Concrete Based on the Maturity Concept).		
PB85-115558	400,062	
REMMERT, W.		
Effectiveness of Solar Shading for an Office Building.		
PB84-217918	400,082	
NBS (National Bureau of Standards) Daylight Availability Database.		
PB84-245745	400,005	
RICHMOND, J. C.		
Measurement Techniques for Evaluating Solar Reflector Materials.		
PB85-119469	400,021	
ROBERTS, W. E.		
Evaluation of Infrared Reflectance as a Technique for Measuring Absorber Materials Degradation.		
PB85-108488	400,019	
ROSS, M.		
Selection, Procurement, and Description of Salem Limestone Samples Used to Study the Effects of Acid Rain.		
PB84-231067	400,059	
ROSSITER, W. J. JR.		
Weatherization of Residences: Criteria for Retrofit Materials and Products.		
PB84-241728	400,093	
RUBIN, A. I.		
Interim Design Guidelines for Automated Offices.		
PB85-100410	400,008	
RUDDER, F. F. JR.		
Line Source and Site Characterizations for Defining the Sound Transmission Loss of Building Facades.		
PB84-227040	400,109	
SANSALONE, M.		
Pulse-Echo Method for Flaw Detection in Concrete.		
PB84-234509	400,060	
SCHOOLEY, J. F.		
Calibration of Temperature Measurement Systems Installed in Buildings.		
PB84-154004	400,030	
SEILER, J. F.		
Performance Criteria for Restoration Coatings for Porcelain Enamel Surfaces.		
PB84-141787	400,026	

SILBERSTEIN, S.

- Air Quality Criteria for Storage of Paper-Based Archival Records,
PB84-135607 400,029
- Performance and Selection Criteria for Mechanical Energy Saving Retrofit Options for Single-Family Residences,
PB84-226075 400,037
- Recent Indoor Air Quality Research in the United States.
PB84-222108 400,054

SIMIU, E.

- Directional Extreme Wind Speed Data for the Design of Buildings and Other Structures.
PB84-178847 400,077
- Multidirectional Analysis of Extreme Wind Speed Data.
PB85-144020 400,099
- Probabilistic Design of Cladding Glass Subjected to Wind Loads.
PB84-221712 400,002
- Probability-Based Wind Load Description for Cladding and Structural Members Sensitive to Wind Direction Effects: A Survey of Recent Research.
PB84-221456 400,087
- Ring-on-Ring Tests and Load Capacity of Cladding Glass.
PB85-106391 400,061
- Structural Reliability Fundamentals and Their Application to Offshore Structures,
PB85-109809 400,069
- Tether Deformation and Tension Leg Platform Surge.
PB84-226117 400,091
- Tornado-Borne Missile Speed Probabilities.
PB85-108611 400,108
- Turbulent Wind Effects on Tension Leg Platform Surge.
PB84-221944 400,088
- Wind Loading and Strength of Cladding Glass.
PB84-221068 400,001

SMITH, C. E.

- Structural Reliability Fundamentals and Their Application to Offshore Structures,
PB85-109809 400,069

SPIEGELMAN, C. H.

- Multidirectional Analysis of Extreme Wind Speed Data.
PB85-144020 400,099

STONE, W. C.

- Comparison of Analytical with Experimental Internal Strain Distribution for the Pullout Test.
PB84-221969 400,056
- Deformation and Failure in Large-Scale Pullout Tests.
PB84-221977 400,057
- Investigation of East Chicago Ramp Collapse.
PB84-227404 400,055

STREED, E. R.

- NBS (National Bureau of Standards) Solar Collector Durability/Reliability Test Program: Final Report,
PB85-113603 400,020

STRUBLE, L. J.

- Evaluation of Ettringite and Related Compounds for Use in Solar Energy Storage.
PB85-146876 400,025

TALLIN, A.

- Probability - Based Design for Engineered Masonry Construction.
PB85-137420 400,097
- Structural Serviceability. Floor Vibrations.
PB84-218882 400,084

THOMAS, W. C.

- NBS (National Bureau of Standards) Solar Collector Durability/Reliability Test Program: Final Report,
PB85-113603 400,020
- Solar Collector Test Procedures: Development of a Method to Refer Measured Efficiencies to Standardized Test Conditions.
PB84-165299 400,017

TREADO, S.

- Effectiveness of Solar Shading for an Office Building.
PB84-217918 400,082
- Measurements of Sky Luminance, Sky Illuminance, and Horizontal Solar Radiation.
PB85-145423 400,003
- NBS (National Bureau of Standards) Daylight Availability Database,
PB84-245745 400,005

TREADO, S. J.

- Effective Use of Daylighting.
PB84-221985 400,034

TRECHSEL, H. R.

- Test Methods and Standards Development for Active Solar Heating and Cooling Systems.
PB84-217447 400,032

VAN MIGOM, M.

- Thermal Performance Testing of Passive Solar Components in the NBS (National Bureau of Standards) Calorimeter,
PB85-119345 400,106

VENTRE, F. T.

- Documentation and Assessment of the GSA/PBS (General Services Administration/Public Buildings Service) Building Systems Program: Final Report and Recommendations,
PB84-155894 400,073
- Innovation in Residential Construction.
PB85-143295 400,006

WAKSMAN, D.

- Evaluation of Infrared Reflectance as a Technique for Measuring Absorber Materials Degradation,
PB85-108488 400,019
- NBS (National Bureau of Standards) Solar Collector Durability/Reliability Test Program: Final Report,
PB85-113603 400,020

WALTON, G. N.

- Conduction Transfer Functions and the Heat Balance Method for Thermal Simulation of Multiroom Buildings.
PB84-223262 400,090

WEBER, B.

- Test Procedures for Rating Residential Heating and Cooling Absorption Equipment,
PB84-216514 400,078

WINN, C. B.

- Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
PB85-153443 400,050

WISE, R. A.

- Fortran 77 Computer Program for Test Procedure Calculations of Vented Heaters,
PB85-109627 400,042
- Test Methods for the Direct Measurement of Stack Energy Loss during the Off-Period of Space Heating Equipment,
PB85-110427 400,105

WOODS, J. E.

- Air Quality Criteria for Storage of Paper-Based Archival Records,
PB84-135607 400,029

WOODWARD, K.

- Influence of Vertical Compressive Stress on Shear Resistance of Concrete Block Masonry Walls,
PB85-119337 400,063
- NBS (National Bureau of Standards) Tri-Directional Test Facility,
PB84-217462 400,103

WORTHLEY, J. A.

- Role of Color in Lighting for Meat and Poultry Inspection.
PB84-177823 400,009

WRIGHT, R.

- Civil Engineering Standards for the Computer Age.
PB85-170587 400,014

WU, S. T.

- Dynamic Response of Structural Systems Subjected to Horizontal Propagating Shear Waves.
PB85-144939 400,100
- Optical-Properties of Black Chrome - A Model for Predicting the Effect of Exposure to Elevated Temperature.
PB85-142784 400,028

WYLY, R. S.

- Field Hydraulic Performance of One- and Two-Story Residential Plumbing Systems with Reduced-Size Vents,
PB85-131878 400,070

YANCEY, C. W. C.

- Materials Research Activities at the National Bureau of Standards (1975-1982) Pertaining to Active Solar Heating and Cooling Systems,
PB84-154780 400,016
- Ring-on-Ring Tests and Load Capacity of Cladding Glass.
PB85-106391 400,061

YANIV, S. L.

- Use of 'Corner Microphones' for Sound Power Measurements in a Reverberation Chamber.
PB84-216985 400,102

YONEMURA, G. T.

- Criteria for Recommending Lighting Levels.
PB85-143311 400,046

ZERDY, G. A.

- Choosing Among Intense Acoustic Background Stimuli - Acoustic Menu.
PB85-145381 400,110

KEY WORD INDEX

Key Word Index

ABSTRACTS

Building Technology Publications, Supplement 8: 1983.
PB84-237197 400,092

ACID RAIN

Selection, Procurement, and Description of Salem Limestone Samples Used to Study the Effects of Acid Rain, PB84-231067 400,059
Procedure for Tristimulus Color Measurements on Building Stone, PB85-133981 400,066

ACOUSTIC ATTENUATION

Line Source and Site Characterizations for Defining the Sound Transmission Loss of Building Facades, PB84-227040 400,109

ACOUSTIC MEASUREMENT

Use of 'Corner Microphones' for Sound Power Measurements in a Reverberation Chamber, PB84-216985 400,102

ACOUSTICS

Choosing Among Intense Acoustic Background Stimuli - Acoustic Menu, PB85-145381 400,110

ACOUSTICS & SOUND

Use of 'Corner Microphones' for Sound Power Measurements in a Reverberation Chamber, PB84-216985 400,102
Choosing Among Intense Acoustic Background Stimuli - Acoustic Menu, PB85-145381 400,110

AERODYNAMICS

Wind Loading and Strength of Cladding Glass, PB84-221068 400,001
Probabilistic Design of Cladding Glass Subjected to Wind Loads, PB84-221712 400,002

AIR FLOW

Air Flow Calibration of Building Pressurization Devices, PB84-217025 400,080

AIR POLLUTION

Air Quality Criteria for Storage of Paper-Based Archival Records, PB84-135607 400,029
Recent Indoor Air Quality Research in the United States, PB84-222108 400,054
Procedure for Tristimulus Color Measurements on Building Stone, PB85-133981 400,066
Impact of Building Codes and Regulations on Indoor Air Quality, PB85-144905 400,047

AIR POLLUTION EFFECTS (MATERIALS)

Air Quality Criteria for Storage of Paper-Based Archival Records, PB84-135607 400,029
Selection, Procurement, and Description of Salem Limestone Samples Used to Study the Effects of Acid Rain, PB84-231067 400,059
Procedure for Tristimulus Color Measurements on Building Stone, PB85-133981 400,066

AIR QUALITY

Air Quality Criteria for Storage of Paper-Based Archival Records, PB84-135607 400,029
Recent Indoor Air Quality Research in the United States, PB84-222108 400,054
Impact of Building Codes and Regulations on Indoor Air Quality, PB85-144905 400,047

ANTIREFLECTION COATINGS

Evaluation of Infrared Reflectance as a Technique for Measuring Absorber Materials Degradation, PB85-108488 400,019

ARCHIVES

Air Quality Criteria for Storage of Paper-Based Archival Records, PB84-135607 400,029

ARCTIC REGIONS

Offshore Concrete Structures in the Arctic: Research Needs, PB84-218353 400,083

ATMOSPHERIC TEMPERATURE

NBS (National Bureau of Standards) Daylight Availability Database, PB84-245745 400,005

AUTOMATION

Interim Design Guidelines for Automated Offices, PB85-100410 400,008

AUTOMATION & ROBOTICS

Interim Design Guidelines for Automated Offices, PB85-100410 400,008

BLACK CHROME

Optical-Properties of Black Chrome - A Model for Predicting the Effect of Exposure to Elevated Temperature, PB85-142784 400,028

BUILDING CODES

Status of Building Code Provisions for Solar Energy Systems, PB84-171610 400,075
Probability-Based Loading Criteria for Codified Design, PB84-221365 400,086
Phase Change Thermal Energy Storage and the Model Building Codes, PB85-111201 400,024
Impact of Building Codes and Regulations on Indoor Air Quality, PB85-144905 400,047

BUILDING STONES

Selection, Procurement, and Description of Salem Limestone Samples Used to Study the Effects of Acid Rain, PB84-231067 400,059
Procedure for Tristimulus Color Measurements on Building Stone, PB85-133981 400,066

BUILDING TECHNOLOGY

Performance Criteria for Restoration Coatings for Porcelain Enamel Surfaces, PB84-141787 400,026
Calibration of Temperature Measurement Systems Installed in Buildings, PB84-154004 400,030
Documentation and Assessment of the GSA/PBS (General Services Administration/Public Buildings Service) Building Systems Program: Final Report and Recommendations, PB84-155894 400,073
On-Site Calibration of Flow Metering Systems Installed in Buildings, PB84-160993 400,074
Solar Collector Test Procedures: Development of a Method to Refer Measured Efficiencies to Standardized Test Conditions, PB84-165299 400,017
Status of Building Code Provisions for Solar Energy Systems, PB84-171610 400,075
Laboratory Evaluation of the Steady-State and Part Load Performance of Absorption Type Heating and Cooling Equipment, PB84-182146 400,031
Test Procedures for Rating Residential Heating and Cooling Absorption Equipment, PB84-216514 400,078
Wind-Tunnel Study of Wind Loading on a Compliant Off-shore Platform, PB84-216522 400,079
Air Flow Calibration of Building Pressurization Devices, PB84-217025 400,080
Control Algorithms for Building Management and Control Systems -- Hot Deck/Cold Deck/Supply Air Reset, Day/Night Setback, Ventilation Purging, and Hot and Chilled Water Reset, PB84-217413 400,081
Test Methods and Standards Development for Active Solar Heating and Cooling Systems, PB84-217447 400,032
NBS (National Bureau of Standards) Tri-Directional Test Facility, PB84-217462 400,103
Effectiveness of Solar Shading for an Office Building, PB84-217918 400,082
Responses to Questions by the General Accounting Office Related to Construction of the Sunshine Skyway Bridge, PB84-218072 400,053
Offshore Concrete Structures in the Arctic: Research Needs, PB84-218353 400,083
Structural Serviceability, Floor Vibrations, PB84-218882 400,084
Wind Loading and Strength of Cladding Glass, PB84-221068 400,001
CIB (Conseil International du Batiment) National Committees as a Mechanism for Communication: An Example, PB84-221258 400,085
Probability-Based Loading Criteria for Codified Design, PB84-221365 400,086
Probability-Based Wind Load Description for Cladding and Structural Members Sensitive to Wind Direction Effects: A Survey of Recent Research, PB84-221456 400,087
Simplified Methods for Determining Seasonal Heat Loss from Uninsulated Slab-on-Grade Floors, PB84-221621 400,033

Probabilistic Design of Cladding Glass Subjected to Wind Loads, PB84-221712 400,002

Comparison of Analytical with Experimental Internal Strain Distribution for the Pullout Test, PB84-221969 400,056

Deformation and Failure in Large-Scale Pullout Tests, PB84-221977 400,057

Effective Use of Daylighting, PB84-221985 400,034

Building Technology Project Summaries, 1983-1984 (of the National Bureau of Standards (NBS) Center for Building Technology), PB84-222249 400,089

Conduction Transfer Functions and the Heat Balance Method for Thermal Simulation of Multiroom Buildings, PB84-223262 400,090

Performance Criteria for Solar Heating and Cooling Systems in Commercial Buildings, PB84-224344 400,036

Line Source and Site Characterizations for Defining the Sound Transmission Loss of Building Facades, PB84-227040 400,109

Investigation of East Chicago Ramp Collapse, PB84-227404 400,055

Impact Resistance of Concrete, PB84-229491 400,058

Building Technology Publications, Supplement 8: 1983, PB84-237197 400,092

Test Results and a Recommended Test Procedure for Heat Traps, PB84-241496 400,038

Weatherization of Residences: Criteria for Retrofit Materials and Products, PB84-241728 400,093

NBS (National Bureau of Standards) Daylight Availability Database, PB84-245745 400,005

Construction Research in Japan, PB85-106839 400,094

Phase Change Thermal Energy Storage and the Model Building Codes, PB85-111201 400,024

NBS (National Bureau of Standards) Solar Collector Durability/Reliability Test Program: Final Report, PB85-113603 400,020

Prediccion de la Resistencia del Concreto a Partir de su Madurez (Method for Prediction of Strength and Resistance of Concrete Based on the Maturity Concept), PB85-115558 400,062

Criteria for Assuring Safety during Erection of Concrete Shell Structures, PB85-118388 400,071

Thermal Performance Testing of Passive Solar Components in the NBS (National Bureau of Standards) Calorimeter, PB85-119345 400,106

Influence of Degree Day Base Temperature on Building Energy Prediction, PB85-120715 400,022

Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities, PB85-121465 400,007

Evaluation of the Sulfate Resistance of Cements in a Controlled Environment, PB85-123628 400,064

Reliability Based Criteria for Reinforced Concrete Design, PB85-123651 400,095

Mechanical Performance Model for Roofing Membranes, PB85-129401 400,065

Field Hydraulic Performance of One- and Two-Story Residential Plumbing Systems with Reduced-Size Vents, PB85-131878 400,070

Statistical Tests of Environmental Load Data, PB85-136232 400,096

Wind Tunnels Applied to Wind Engineering in Japan, PB85-136810 400,107

Probability - Based Design for Engineered Masonry Construction, PB85-137420 400,097

West Virginia Cooling Tower Collapse Caused by Premature Form Removal, PB85-140424 400,098

Performances of Different Passive Solar Systems at the NBS (National Bureau of Standards) Test Facility, PB85-141430 400,045

Laboratory Study of Flaw Detection in Concrete by the Pulse-Echo Method, PB85-141505 400,067

Innovation in Residential Construction, PB85-143295 400,006

Multidirectional Analysis of Extreme Wind Speed Data. PB85-144020	400,099	CHROMATICITY Role of Color in Lighting for Meat and Poultry Inspection. PB84-177823	400,009	Probability - Based Design for Engineered Masonry Construction. PB85-137420	400,097
Dynamic Response of Structural Systems Subjected to Horizontal Propagating Shear Waves. PB85-144939	400,100	CIVIL ENGINEERING Civil Engineering Standards for the Computer Age. PB85-170587	400,014	CONSTRUCTION INDUSTRY Building Technology Project Summaries, 1983-1984 (of the National Bureau of Standards (NEL) Center for Building Technology). PB84-222249	400,089
Some Statistical Aspects of Wind and Snow Loading. PB85-144947	400,101	CLADDING Wind Loading and Strength of Cladding Glass. PB84-221068	400,001	Building Technology Publications, Supplement 8: 1983. PB84-237197	400,092
Climate Data Abbreviation for the Computerised Calculation of Heating and Cooling Requirements in Buildings. PB85-145407	400,048	Probabilistic Design of Cladding Glass Subjected to Wind Loads. PB84-221712	400,002	Construction Research in Japan. PB85-106839	400,094
Measurements of Sky Luminance, Sky Illuminance, and Horizontal Solar Radiation. PB85-145423	400,003	CLIMATE Climate Data Abbreviation for the Computerised Calculation of Heating and Cooling Requirements in Buildings. PB85-145407	400,048	Innovation in Residential Construction. PB85-143295	400,006
Evaluation of Etringite and Related Compounds for Use in Solar Energy Storage. PB85-146876	400,025	CLIMATOLOGY Statistical Tests of Environmental Load Data. PB85-136232	400,096	CONSTRUCTION MATERIALS Criteria for Mechanical Systems in Multifamily Buildings for Residential Weatherization Options. PB85-120129	400,043
Ventilation Concepts for Office Buildings. PB85-151561	400,049	COLLAPSE Investigation of East Chicago Ramp Collapse. PB84-227404	400,055	Uses of Waste Materials and By-Products in Construction. PB85-142339	400,068
Thickness Effect in Low-Density Insulation. PB85-163376	400,051	West Virginia Cooling Tower Collapse Caused by Premature Form Removal. PB85-140424	400,098	COOLING Test Procedures for Rating Residential Heating and Cooling Absorption Equipment. PB84-216514	400,078
BUILDINGS		COLORIMETRIC ANALYSIS Procedure for Tristimulus Color Measurements on Building Stone. PB85-133981	400,066	Effectiveness of Solar Shading for an Office Building. PB84-217918	400,082
Calibration of Temperature Measurement Systems Installed in Buildings. PB84-154004	400,030	COLORS (MATERIALS) Role of Color in Lighting for Meat and Poultry Inspection. PB84-177823	400,009	COOLING LOAD Climate Data Abbreviation for the Computerised Calculation of Heating and Cooling Requirements in Buildings. PB85-145407	400,048
Documentation and Assessment of the GSA/PBS (General Services Administration/Public Buildings Service) Building Systems Program: Final Report and Recommendations. PB84-155894	400,073	COMBUSTORS Procedures for Determining Annual Efficiency for Furnaces and Vented Household Heaters with Modulating-Type Controls. PB84-243997	400,039	COOLING SYSTEMS Phase Change Thermal Energy Storage and the Model Building Codes. PB85-111201	400,024
On-Site Calibration of Flow Metering Systems Installed in Buildings. PB84-160993	400,074	COMMERCIAL BUILDINGS Effectiveness of Solar Shading for an Office Building. PB84-217918	400,082	Criteria for Mechanical Systems in Multifamily Buildings for Residential Weatherization Options. PB85-120129	400,043
Economizer Algorithms for Energy Management and Control Systems. PB84-178284	400,076	COMMUNICATIONS CIB (Conseil International du Batiment) National Committees as a Mechanism for Communication: An Example. PB84-221258	400,085	COOLING TOWERS West Virginia Cooling Tower Collapse Caused by Premature Form Removal. PB85-140424	400,098
Air Flow Calibration of Building Pressurization Devices. PB84-217025	400,080	COMPUTER PROGRAMS Fortran 77 Computer Program for Test Procedure Calculations of Vented Heaters. PB85-109627	400,042	CORROSION Nondestructive Corrosion Detection Under Organic Films Using Infrared Thermography. PB84-225416	400,027
Control Algorithms for Building Management and Control Systems -- Hot Deck/Cold Deck/Supply Air Reset, Day/Night Setback, Ventilation Purging, and Hot and Chilled Water Reset. PB84-217413	400,081	COMPUTER SCIENCE & TECHNOLOGY Modular Data Acquisition and Display Software System for a Laboratory Environment. PB84-217892	400,013	CORROSION PREVENTION Evaluation of the Sulfate Resistance of Cements in a Controlled Environment. PB85-123628	400,064
NBS (National Bureau of Standards) Tri-Directional Test Facility. PB84-217462	400,103	Civil Engineering Standards for the Computer Age. PB85-170587	400,014	CRACKING (FRACTURING) Comparison of Analytical with Experimental Internal Strain Distribution for the Pullout Test. PB84-221969	400,056
CIB (Conseil International du Batiment) National Committees as a Mechanism for Communication: An Example. PB84-221258	400,085	COMPUTER SOFTWARE Modular Data Acquisition and Display Software System for a Laboratory Environment. PB84-217892	400,013	Deformation and Failure in Large-Scale Pullout Tests. PB84-221977	400,057
Probability-Based Wind Load Description for Cladding and Structural Members Sensitive to Wind Direction Effects: A Survey of Recent Research. PB84-221456	400,087	CONCRETE Impact Resistance of Concrete. PB84-229491	400,058	DAYLIGHT NBS (National Bureau of Standards) Daylight Availability Database. PB84-245745	400,005
Building Technology Project Summaries, 1983-1984 (of the National Bureau of Standards (NEL) Center for Building Technology). PB84-222249	400,089	Pulse-Echo Method for Flaw Detection in Concrete. PB84-234509	400,060	DAYLIGHTING Effective Use of Daylighting. PB84-221985	400,034
Conduction Transfer Functions and the Heat Balance Method for Thermal Simulation of Multiroom Buildings. PB84-223262	400,090	CONCRETE BLOCKS Influence of Vertical Compressive Stress on Shear Resistance of Concrete Block Masonry Walls. PB85-119337	400,063	Daylighting Computation Procedure for Use in DOE-2 and Other Dynamic Building Energy Analysis Programs. PB84-246032	400,040
Strategies for Energy Conservation for a School Building. PB84-224302	400,035	CONCRETE STRUCTURES Offshore Concrete Structures in the Arctic: Research Needs. PB84-218353	400,083	Measurements of Sky Luminance, Sky Illuminance, and Horizontal Solar Radiation. PB85-145423	400,003
Line Source and Site Characterizations for Defining the Sound Transmission Loss of Building Facades. PB84-227040	400,109	CONCRETES Comparison of Analytical with Experimental Internal Strain Distribution for the Pullout Test. PB84-221969	400,056	DEFLECTION Structural Serviceability. Floor Vibrations. PB84-218882	400,084
NBS (National Bureau of Standards) Daylight Availability Database. PB84-245745	400,005	Deformation and Failure in Large-Scale Pullout Tests. PB84-221977	400,057	DESIGN CRITERIA Reliability Based Criteria for Reinforced Concrete Design. PB85-123651	400,095
Influence of Degree Day Base Temperature on Building Energy Prediction. PB85-120715	400,022	Prediccion de la Resistencia del Concreto a Partir de su Madurez (Method for Prediction of Strength and Resistance of Concrete Based on the Maturity Concept). PB85-115558	400,062	DRIVES Experimental Evaluation of Engine-Driven Heat Pump Systems. PB85-120657	400,044
Reliability Based Criteria for Reinforced Concrete Design. PB85-123651	400,095	Laboratory Study of Flaw Detection in Concrete by the Pulse-Echo Method. PB85-141505	400,067	DYNAMIC STRUCTURAL ANALYSIS Dynamic Response of Structural Systems Subjected to Horizontal Propagating Shear Waves. PB85-144939	400,100
Innovation in Residential Construction. PB85-143295	400,006	CONSTRUCTION Responses to Questions by the General Accounting Office Related to Construction of the Sunshine Skyway Bridge. PB84-218072	400,053	EARTHQUAKE ENGINEERING Building Technology Publications, Supplement 8: 1983. PB84-237197	400,092
CALIBRATING		Criteria for Assuring Safety during Erection of Concrete Shell Structures. PB85-118388	400,071	Dynamic Response of Structural Systems Subjected to Horizontal Propagating Shear Waves. PB85-144939	400,100
Calibration of Temperature Measurement Systems Installed in Buildings. PB84-154004	400,030			EARTHQUAKE RESISTANT STRUCTURES NBS (National Bureau of Standards) Tri-Directional Test Facility. PB84-217462	400,103
CALORIMETERS					
Thermal Performance Testing of Passive Solar Components in the NBS (National Bureau of Standards) Calorimeter. PB85-119345	400,106				
CEMENTS					
Evaluation of the Sulfate Resistance of Cements in a Controlled Environment. PB85-123628	400,064				
CERTIFICATION					
Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities. PB85-121465	400,007				

Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities, PB85-121465	400,007	Climate Data Abbreviation for the Computerised Calculation of Heating and Cooling Requirements in Buildings. PB85-145407	400,048	Role of Color in Lighting for Meat and Poultry Inspection, PB84-177823	400,009
ELECTRIC OUTLETS		ENERGY FORECASTS		Fastest-Mile Wind Speeds in Hurricane Alicia. PB84-220771	400,004
Effects of Thermal Insulation Penetrating Electrical Boxes. PB84-239334	400,015	Influence of Degree Day Base Temperature on Building Energy Prediction. PB85-120715	400,022	GLASS	
ELECTRIC POWER DEMAND		ENERGY MANAGEMENT		Wind Loading and Strength of Cladding Glass. PB84-221068	400,001
Demand Limiting Algorithms for Energy Management and Control Systems, PB84-167675	400,018	Demand Limiting Algorithms for Energy Management and Control Systems, PB84-167675	400,018	Probabilistic Design of Cladding Glass Subjected to Wind Loads. PB84-221712	400,002
ENAMELS		Economizer Algorithms for Energy Management and Control Systems, PB84-178284	400,076	HEALTH & SAFETY	
Performance Criteria for Restoration Coatings for Porcelain Enamel Surfaces, PB84-141787	400,026	ENERGY MANAGEMENT SYSTEMS		Use of Hazard Pictorials/Symbols in the Minerals Industry. PB84-165877	400,011
ENERGY CONSERVATION		On-Site Calibration of Flow Metering Systems Installed in Buildings. PB84-160993	400,074	Criteria for Recommending Lighting Levels. PB85-143311	400,046
On-Site Calibration of Flow Metering Systems Installed in Buildings. PB84-160993	400,074	ENERGY REQUIREMENTS		Impact of Building Codes and Regulations on Indoor Air Quality. PB85-144905	400,047
Economizer Algorithms for Energy Management and Control Systems, PB84-178284	400,076	NBS (National Bureau of Standards) Daylight Availability Database, PB84-245745	400,005	HEAT BALANCE	
Strategies for Energy Conservation for a School Building. PB84-224302	400,035	ENERGY STORAGE		Conduction Transfer Functions and the Heat Balance Method for Thermal Simulation of Multiroom Buildings. PB84-223262	400,090
Performance and Selection Criteria for Mechanical Energy Saving Retrofit Options for Single-Family Residences, PB84-226075	400,037	Evaluation of Ettringite and Related Compounds for Use in Solar Energy Storage. PB85-146876	400,025	HEAT LOSS	
Building Technology Publications, Supplement 8: 1983. PB84-237197	400,092	ENGINEERING/PRODUCT/INFORMATION STANDARDS		Simplified Methods for Determining Seasonal Heat Loss from Uninsulated Slab-on-Grade Floors. PB84-221621	400,033
Test Results and a Recommended Test Procedure for Heat Traps, PB84-241496	400,038	Demand Limiting Algorithms for Energy Management and Control Systems, PB84-167675	400,018	Thermographic Inspection of Exterior Wall Insulation Retrofits. PB85-102788	400,041
Procedures for Determining Annual Efficiency for Furnaces and Vented Household Heaters with Modulating-Type Controls. PB84-243997	400,039	Economizer Algorithms for Energy Management and Control Systems, PB84-178284	400,076	HEAT PUMPS	
Daylighting Computation Procedure for Use in DOE-2 and Other Dynamic Building Energy Analysis Programs. PB84-246032	400,040	ENGINES		Laboratory Evaluation of the Steady-State and Part Load Performance of Absorption Type Heating and Cooling Equipment, PB84-182146	400,031
ENERGY CONSERVATION & PRODUCTION		Experimental Evaluation of Engine-Driven Heat Pump Systems. PB85-120657	400,044	Experimental Evaluation of Engine-Driven Heat Pump Systems. PB85-120657	400,044
Comparative Analysis of Thermographic Inspections Performed on Retrofitted Homes, PB84-142231	400,072	ENVIRONMENTAL ENGINEERING		HEAT TRAPS	
Strategies for Energy Conservation for a School Building. PB84-224302	400,035	Air Quality Criteria for Storage of Paper-Based Archival Records. PB84-135607	400,029	Test Results and a Recommended Test Procedure for Heat Traps, PB84-241496	400,038
Performance and Selection Criteria for Mechanical Energy Saving Retrofit Options for Single-Family Residences, PB84-226075	400,037	Economizer Algorithms for Energy Management and Control Systems, PB84-178284	400,076	HEATING	
Effects of Thermal Insulation Penetrating Electrical Boxes. PB84-239334	400,015	Control Algorithms for Building Management and Control Systems -- Hot Deck/Cold Deck/Supply Air Reset, Day/Night Setback, Ventilation Purging, and Hot and Chilled Water Reset, PB84-217413	400,081	Test Procedures for Rating Residential Heating and Cooling Absorption Equipment, PB84-216514	400,078
Procedures for Determining Annual Efficiency for Furnaces and Vented Household Heaters with Modulating-Type Controls. PB84-243997	400,039	ENVIRONMENTAL STUDIES: POLLUTION MEASUREMENT		HEATING EQUIPMENT	
Daylighting Computation Procedure for Use in DOE-2 and Other Dynamic Building Energy Analysis Programs. PB84-246032	400,040	Recent Indoor Air Quality Research in the United States. PB84-222108	400,054	Procedures for Determining Annual Efficiency for Furnaces and Vented Household Heaters with Modulating-Type Controls. PB84-243997	400,039
National Bureau of Standards Passive Solar Test Facility - Instrumentation and Site Handbook, PB85-100451	400,104	Selection, Procurement, and Description of Salem Limestone Samples Used to Study the Effects of Acid Rain, PB84-231067	400,059	Criteria for Mechanical Systems in Multifamily Buildings for Residential Weatherization Options, PB85-120129	400,043
Thermographic Inspection of Exterior Wall Insulation Retrofits. PB85-102788	400,041	Procedure for Tristimulus Color Measurements on Building Stone, PB85-133981	400,066	HEATING LOAD	
Test Methods for the Direct Measurement of Stack Energy Loss during the Off-Period of Space Heating Equipment, PB85-110427	400,105	Uses of Waste Materials and By-Products in Construction. PB85-142339	400,068	Climate Data Abbreviation for the Computerised Calculation of Heating and Cooling Requirements in Buildings. PB85-145407	400,048
Measurement Techniques for Evaluating Solar Reflector Materials. PB85-119469	400,021	ETTRINGITE		HEATING SYSTEMS	
Criteria for Mechanical Systems in Multifamily Buildings for Residential Weatherization Options, PB85-120129	400,043	Evaluation of Ettringite and Related Compounds for Use in Solar Energy Storage. PB85-146876	400,025	Performance and Selection Criteria for Mechanical Energy Saving Retrofit Options for Single-Family Residences, PB84-226075	400,037
Experimental Evaluation of Engine-Driven Heat Pump Systems. PB85-120657	400,044	FACILITIES		Phase Change Thermal Energy Storage and the Model Building Codes. PB85-111201	400,024
Multi-Year Plan for Experimental Systems Research-Passive and Hybrid Solar Energy Program, PB85-146868	400,023	Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities, PB85-121465	400,007	HIGHWAY BRIDGES	
Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems. PB85-153443	400,050	FLOORS		Responses to Questions by the General Accounting Office Related to Construction of the Sunshine Skyway Bridge, PB84-218072	400,053
Short Duration Winter-Time Performances of Different Passive Solar Systems, PB85-163392	400,052	Structural Serviceability. Floor Vibrations. PB84-218882	400,084	HIGHWAYS	
ENERGY CONSUMPTION		Simplified Methods for Determining Seasonal Heat Loss from Uninsulated Slab-on-Grade Floors. PB84-221621	400,033	Investigation of East Chicago Ramp Collapse. PB84-227404	400,055
Effectiveness of Solar Shading for an Office Building. PB84-217918	400,082	FLOWMETERS		HOUSES	
Influence of Degree Day Base Temperature on Building Energy Prediction. PB85-120715	400,022	On-Site Calibration of Flow Metering Systems Installed in Buildings. PB84-160993	400,074	Recent Indoor Air Quality Research in the United States. PB84-222108	400,054
		FOOD ANALYSIS		Weatherization of Residences: Criteria for Retrofit Materials and Products. PB84-241728	400,093
		Role of Color in Lighting for Meat and Poultry Inspection, PB84-177823	400,009	Thermographic Inspection of Exterior Wall Insulation Retrofits. PB85-102788	400,041
		FOOD INSPECTION		HURRICANES	
		Role of Color in Lighting for Meat and Poultry Inspection, PB84-177823	400,009	Fastest-Mile Wind Speeds in Hurricane Alicia. PB84-220771	400,004
		FURNACES		ILLUMINANCE	
		Procedures for Determining Annual Efficiency for Furnaces and Vented Household Heaters with Modulating-Type Controls. PB84-243997	400,039	Measurements of Sky Luminance, Sky Illuminance, and Horizontal Solar Radiation. PB85-145423	400,003
		GENERAL INTEREST		ILLUMINATING	
		Air Quality Criteria for Storage of Paper-Based Archival Records, PB84-135607	400,029	Criteria for Recommending Lighting Levels. PB85-143311	400,046

IMPACT STRENGTH		
Impact Resistance of Concrete. PB84-229491	400,058	
INDOOR AIR POLLUTION		
Recent Indoor Air Quality Research in the United States. PB84-222108	400,054	
Impact of Building Codes and Regulations on Indoor Air Quality. PB85-144905	400,047	
INFRARED DETECTORS		
Nondestructive Corrosion Detection Under Organic Films Using Infrared Thermography. PB84-225416	400,027	
INSTRUMENTATION & EXPERIMENTAL METHODS		
Pulse-Echo Method for Flaw Detection in Concrete. PB84-234509	400,060	
IRRADIANCE		
NBS (National Bureau of Standards) Daylight Availability Database. PB84-245745	400,005	
LABORATORY EQUIPMENT		
Modular Data Acquisition and Display Software System for a Laboratory Environment. PB84-217892	400,013	
LATENT HEAT STORAGE		
Evaluation of Ettringite and Related Compounds for Use in Solar Energy Storage. PB85-146876	400,025	
LIMESTONE		
Selection, Procurement, and Description of Salem Limestone Samples Used to Study the Effects of Acid Rain. PB84-231067	400,059	
LIQUEFIED NATURAL GAS		
Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities. PB85-121465	400,007	
LOADS (FORCES)		
Wind Loading and Strength of Cladding Glass. PB84-221068	400,001	
Probability-Based Loading Criteria for Codified Design. PB84-221365	400,086	
Probabilistic Design of Cladding Glass Subjected to Wind Loads. PB84-221712	400,002	
LUMINANCE		
NBS (National Bureau of Standards) Daylight Availability Database. PB84-245745	400,005	
Measurements of Sky Luminance, Sky Illuminance, and Horizontal Solar Radiation. PB85-145423	400,003	
MASONRY		
Influence of Vertical Compressive Stress on Shear Resistance of Concrete Block Masonry Walls. PB85-119337	400,063	
Probability - Based Design for Engineered Masonry Construction. PB85-137420	400,097	
MATERIALS		
Measurement Techniques for Evaluating Solar Reflector Materials. PB85-119469	400,021	
MATHEMATICAL & STATISTICAL METHODS		
Tornado-Borne Missile Speed Probabilities. PB85-108611	400,108	
Practical Approximations of Peak Wave Forces. PB85-138592	400,010	
MEASUREMENT SCIENCE & TECHNOLOGY: PHYSICAL STANDARDS & FUNDAMENTAL CONSTANTS		
Nondestructive Corrosion Detection Under Organic Films Using Infrared Thermography. PB84-225416	400,027	
MEAT		
Role of Color in Lighting for Meat and Poultry Inspection. PB84-177823	400,009	
MECHANICS: DESIGN/TESTING/MEASUREMENT		
Directional Extreme Wind Speed Data for the Design of Buildings and Other Structures. PB84-178847	400,077	
Turbulent Wind Effects on Tension Leg Platform Surge. PB84-221944	400,088	
Tether Deformation and Tension Leg Platform Surge. PB84-226117	400,091	
Fortran 77 Computer Program for Test Procedure Calculations of Vented Heaters. PB85-109627	400,042	
Structural Reliability Fundamentals and Their Application to Offshore Structures. PB85-109809	400,069	
Size Effect in Simple Shear Testing. PB85-137719	400,012	
MEETINGS		
Probability-Based Wind Load Description for Cladding and Structural Members Sensitive to Wind Direction Effects: A Survey of Recent Research. PB84-221456	400,087	
METEOROLOGICAL DATA		
Directional Extreme Wind Speed Data for the Design of Buildings and Other Structures. PB84-178847	400,077	
MINE SAFETY		
Use of Hazard Pictorials/Symbols in the Minerals Industry. PB84-165877	400,011	
MINERAL INDUSTRIES		
Use of Hazard Pictorials/Symbols in the Minerals Industry. PB84-165877	400,011	
MINING		
Use of Hazard Pictorials/Symbols in the Minerals Industry. PB84-165877	400,011	
MODULATORS		
Procedures for Determining Annual Efficiency for Furnaces and Vented Household Heaters with Modulating-Type Controls. PB84-243997	400,039	
NOISE (SOUND)		
Choosing Among Intense Acoustic Background Stimuli - Acoustic Menu. PB85-145381	400,110	
NONDESTRUCTIVE TESTING		
Nondestructive Corrosion Detection Under Organic Films Using Infrared Thermography. PB84-225416	400,027	
NONDESTRUCTIVE TESTS		
Laboratory Study of Flaw Detection in Concrete by the Pulse-Echo Method. PB85-141505	400,067	
NUCLEAR POWER PLANTS		
Tornado-Borne Missile Speed Probabilities. PB85-108611	400,108	
OFFICE BUILDINGS		
Recent Indoor Air Quality Research in the United States. PB84-222108	400,054	
Ventilation Concepts for Office Buildings. PB85-151561	400,049	
OFFICE MANAGEMENT		
Interim Design Guidelines for Automated Offices. PB85-100410	400,008	
OFFSHORE STRUCTURES		
Wind-Tunnel Study of Wind Loading on a Compliant Offshore Platform. PB84-216522	400,079	
Offshore Concrete Structures in the Arctic: Research Needs. PB84-218353	400,083	
Turbulent Wind Effects on Tension Leg Platform Surge. PB84-221944	400,088	
Tether Deformation and Tension Leg Platform Surge. PB84-226117	400,091	
Structural Reliability Fundamentals and Their Application to Offshore Structures. PB85-109809	400,069	
ORGANIC COATINGS		
Performance Criteria for Restoration Coatings for Porcelain Enamel Surfaces. PB84-141787	400,026	
PAPERS		
Air Quality Criteria for Storage of Paper-Based Archival Records. PB84-135607	400,029	
PASSIVE SOLAR HEATING SYSTEMS		
Performances of Different Passive Solar Systems at the NBS (National Bureau of Standards) Test Facility. PB85-141430	400,045	
Short Duration Winter-Time Performances of Different Passive Solar Systems. PB85-163392	400,052	
PERFORMANCE TESTS		
NBS (National Bureau of Standards) Solar Collector Durability/Reliability Test Program: Final Report. PB85-113603	400,020	
PHASE CHANGE MATERIALS		
Phase Change Thermal Energy Storage and the Model Building Codes. PB85-111201	400,024	
Evaluation of Ettringite and Related Compounds for Use in Solar Energy Storage. PB85-146876	400,025	
PLATFORMS		
Wind-Tunnel Study of Wind Loading on a Compliant Offshore Platform. PB84-216522	400,079	
Turbulent Wind Effects on Tension Leg Platform Surge. PB84-221944	400,088	
Tether Deformation and Tension Leg Platform Surge. PB84-226117	400,091	
PLUMBING		
Field Hydraulic Performance of One- and Two-Story Residential Plumbing Systems with Reduced-Size Vents. PB85-131878	400,070	
POLYMER FILMS		
Nondestructive Corrosion Detection Under Organic Films Using Infrared Thermography. PB84-225416	400,027	
POULTRY		
Role of Color in Lighting for Meat and Poultry Inspection. PB84-177823	400,009	
PROJECT MANAGEMENT		
Documentation and Assessment of the GSA/PBS (General Services Administration/Public Buildings Service) Building Systems Program: Final Report and Recommendations. PB84-155894	400,073	
PROPERTIES OF MATERIALS: STRUCTURAL/MECHANICAL		
Materials Research Activities at the National Bureau of Standards (1975-1982) Pertaining to Active Solar Heating and Cooling Systems. PB84-154780	400,016	
Ring-on-Ring Tests and Load Capacity of Cladding Glass. PB85-106391	400,061	
Evaluation of Infrared Reflectance as a Technique for Measuring Absorber Materials Degradation. PB85-108488	400,019	
Influence of Vertical Compressive Stress on Shear Resistance of Concrete Block Masonry Walls. PB85-119337	400,063	
PROTECTIVE COATINGS		
Performance Criteria for Restoration Coatings for Porcelain Enamel Surfaces. PB84-141787	400,026	
Nondestructive Corrosion Detection Under Organic Films Using Infrared Thermography. PB84-225416	400,027	
PULLOUT TESTS		
Comparison of Analytical with Experimental Internal Strain Distribution for the Pullout Test. PB84-221969	400,056	
Deformation and Failure in Large-Scale Pullout Tests. PB84-221977	400,057	
RAMPS		
Investigation of East Chicago Ramp Collapse. PB84-227404	400,055	
REINFORCED CONCRETE		
Reliability Based Criteria for Reinforced Concrete Design. PB85-123651	400,095	
RENOVATING		
Performance Criteria for Restoration Coatings for Porcelain Enamel Surfaces. PB84-141787	400,026	
RESEARCH		
Construction Research in Japan. PB85-106839	400,094	
RESEARCH MANAGEMENT		
Multi-Year Plan for Experimental Systems Research-Passive and Hybrid Solar Energy Program. PB85-146868	400,023	
Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems. PB85-153443	400,050	
RESEARCH PROJECTS		
Building Technology Project Summaries, 1983-1984 (of the National Bureau of Standards (NBS) Center for Building Technology). PB84-222249	400,089	
RESIDENTIAL BUILDINGS		
Comparative Analysis of Thermographic Inspections Performed on Retrofitted Homes. PB84-142231	400,072	
Test Procedures for Rating Residential Heating and Cooling Absorption Equipment. PB84-216514	400,078	
Performance and Selection Criteria for Mechanical Energy Saving Retrofit Options for Single-Family Residences. PB84-226075	400,037	
Criteria for Mechanical Systems in Multifamily Buildings for Residential Weatherization Options. PB85-120129	400,043	
ROOFING		
Mechanical Performance Model for Roofing Membranes. PB85-129401	400,065	
SAFETY ENGINEERING		
Use of Hazard Pictorials/Symbols in the Minerals Industry. PB84-165877	400,011	

Criteria for Assuring Safety during Erection of Concrete Shell Structures. PB85-118388	400,071	Active Solar Hot Water and Space Conditioning Systems. PB85-153443	400,050	THERMAL INSULATION Comparative Analysis of Thermographic Inspections Performed on Retrofitted Homes. PB84-142231	400,072
SALEM LIMESTONE Selection, Procurement, and Description of Salem Limestone Samples Used to Study the Effects of Acid Rain. PB84-231067	400,059	SONIC TESTS Laboratory Study of Flaw Detection in Concrete by the Pulse-Echo Method. PB85-141505	400,067	Effects of Thermal Insulation Penetrating Electrical Boxes. PB84-239334	400,015
SCHOOL BUILDINGS Strategies for Energy Conservation for a School Building. PB84-224302	400,035	SOUND TRANSMISSION Line Source and Site Characterizations for Defining the Sound Transmission Loss of Building Facades. PB84-227040	400,109	Thickness Effect in Low-Density Insulation. PB85-163376	400,051
SHADES Effectiveness of Solar Shading for an Office Building. PB84-217918	400,082	SPACE HEATERS Fortran 77 Computer Program for Test Procedure Calculations of Vented Heaters. PB85-109627	400,042	THERMAL MEASUREMENTS Thermal Performance Testing of Passive Solar Components in the NBS (National Bureau of Standards) Calorimeter. PB85-119345	400,106
SHEAR TESTS Size Effect in Simple Shear Testing. PB85-137719	400,012	SPACE HEATING Test Methods for the Direct Measurement of Stack Energy Loss during the Off-Period of Space Heating Equipment. PB85-110427	400,105	THERMOGRAPHIC INSPECTION Comparative Analysis of Thermographic Inspections Performed on Retrofitted Homes. PB84-142231	400,072
SHEET GLASS Ring-on-Ring Tests and Load Capacity of Cladding Glass. PB85-106391	400,061	STANDARDS Civil Engineering Standards for the Computer Age. PB85-170587	400,014	THERMOGRAPHY Nondestructive Corrosion Detection Under Organic Films Using Infrared Thermography. PB84-225416	400,027
SKY Measurements of Sky Luminance, Sky Illuminance, and Horizontal Solar Radiation. PB85-145423	400,003	STIMULUS (PSYCHOPHYSIOLOGY) Choosing Among Intense Acoustic Background Stimuli - Acoustic Menu. PB85-145381	400,110	ULTRASONIC TESTS Pulse-Echo Method for Flaw Detection in Concrete. PB84-234509	400,060
SKY BRIGHTNESS NBS (National Bureau of Standards) Daylight Availability Database. PB84-245745	400,005	STORMS Practical Approximations of Peak Wave Forces. PB85-138592	400,010	VENTILATION Ventilation Concepts for Office Buildings. PB85-151561	400,049
SLAB ON GROUND CONSTRUCTION Simplified Methods for Determining Seasonal Heat Loss from Uninsulated Slab-on-Grade Floors. PB84-221621	400,033	STRAIN MEASUREMENT Comparison of Analytical with Experimental Internal Strain Distribution for the Pullout Test. PB84-221969	400,056	VIBRATION Structural Serviceability. Floor Vibrations. PB84-218882	400,084
SNOW Some Statistical Aspects of Wind and Snow Loading. PB85-144947	400,101	Deformation and Failure in Large-Scale Pullout Tests. PB84-221977	400,057	WALLS Influence of Vertical Compressive Stress on Shear Resistance of Concrete Block Masonry Walls. PB85-119337	400,063
SOIL MECHANICS Size Effect in Simple Shear Testing. PB85-137719	400,012	STRUCTURAL ANALYSIS NBS (National Bureau of Standards) Tri-Directional Test Facility. PB84-217462	400,103	WASTES UTILIZATION Uses of Waste Materials and By-Products in Construction. PB85-142339	400,068
SOLAR ABSORBERS Evaluation of Infrared Reflectance as a Technique for Measuring Absorber Materials Degradation. PB85-108488	400,019	STRUCTURAL DESIGN Statistical Tests of Environmental Load Data. PB85-136232	400,096	WATER CHILLERS Laboratory Evaluation of the Steady-State and Part Load Performance of Absorption Type Heating and Cooling Equipment. PB84-182146	400,031
SOLAR COLLECTORS Solar Collector Test Procedures: Development of a Method to Refer Measured Efficiencies to Standardized Test Conditions. PB84-165299	400,017	STRUCTURAL ENGINEERING Multidirectional Analysis of Extreme Wind Speed Data. PB85-144020	400,099	WATER HEATERS Test Results and a Recommended Test Procedure for Heat Traps. PB84-241496	400,038
NBS (National Bureau of Standards) Solar Collector Durability/Reliability Test Program: Final Report. PB85-113603	400,020	Some Statistical Aspects of Wind and Snow Loading. PB85-144947	400,101	WATER WAVES Practical Approximations of Peak Wave Forces. PB85-138592	400,010
SOLAR COOLING Status of Building Code Provisions for Solar Energy Systems. PB84-171610	400,075	STRUCTURES Directional Extreme Wind Speed Data for the Design of Buildings and Other Structures. PB84-178847	400,077	WEATHERING Selection, Procurement, and Description of Salem Limestone Samples Used to Study the Effects of Acid Rain. PB84-231067	400,059
SOLAR ENERGY Status of Building Code Provisions for Solar Energy Systems. PB84-171610	400,075	SULFATES Evaluation of the Sulfate Resistance of Cements in a Controlled Environment. PB85-123628	400,064	WEATHERIZATION Criteria for Mechanical Systems in Multifamily Buildings for Residential Weatherization Options. PB85-120129	400,043
National Bureau of Standards Passive Solar Test Facility - Instrumentation and Site Handbook. PB85-100451	400,104	SUNSHINE HIGHWAY BRIDGE Responses to Questions by the General Accounting Office Related to Construction of the Sunshine Skyway Bridge. PB84-218072	400,053	WEATHERPROOFING Weatherization of Residences: Criteria for Retrofit Materials and Products. PB84-241728	400,093
Multi-Year Plan for Experimental Systems Research-Passive and Hybrid Solar Energy Program. PB85-146868	400,023	SURFACES & INTERFACES Optical-Properties of Black Chrome - A Model for Predicting the Effect of Exposure to Elevated Temperature. PB85-142784	400,028	WIND LOADS Wind-Tunnel Study of Wind Loading on a Compliant Off-shore Platform. PB84-216522	400,079
Evaluation of Ettringite and Related Compounds for Use in Solar Energy Storage. PB85-146876	400,025	SWITCHGEAR Effects of Thermal Insulation Penetrating Electrical Boxes. PB84-239334	400,015	Probability-Based Wind Load Description for Cladding and Structural Members Sensitive to Wind Direction Effects: A Survey of Recent Research. PB84-221456	400,087
SOLAR HEATING Materials Research Activities at the National Bureau of Standards (1975-1982) Pertaining to Active Solar Heating and Cooling Systems. PB84-154780	400,016	SYMBOLS Use of Hazard Pictorials/Symbols in the Minerals Industry. PB84-165877	400,011	Turbulent Wind Effects on Tension Leg Platform Surge. PB84-221944	400,088
Test Methods and Standards Development for Active Solar Heating and Cooling Systems. PB84-217447	400,032	SYNTHESIS (CHEMISTRY) Evaluation of Ettringite and Related Compounds for Use in Solar Energy Storage. PB85-146876	400,025	WIND PRESSURE Wind Loading and Strength of Cladding Glass. PB84-221068	400,001
Performance Criteria for Solar Heating and Cooling Systems in Commercial Buildings. PB84-224344	400,036	TECHNOLOGY INNOVATION Innovation in Residential Construction. PB85-143295	400,006	Probabilistic Design of Cladding Glass Subjected to Wind Loads. PB84-221712	400,002
Performances of Different Passive Solar Systems at the NBS (National Bureau of Standards) Test Facility. PB85-141430	400,045	TEMPERATURE MEASURING INSTRUMENTS Calibration of Temperature Measurement Systems Installed in Buildings. PB84-154004	400,030	Some Statistical Aspects of Wind and Snow Loading. PB85-144947	400,101
Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems. PB85-153443	400,050	TEST FACILITIES NBS (National Bureau of Standards) Tri-Directional Test Facility. PB84-217462	400,103	WIND TUNNELS Wind Tunnels Applied to Wind Engineering in Japan. PB85-136810	400,107
SOLAR REFLECTORS Measurement Techniques for Evaluating Solar Reflector Materials. PB85-119469	400,021	National Bureau of Standards Passive Solar Test Facility - Instrumentation and Site Handbook. PB85-100451	400,104	WIND VELOCITY Directional Extreme Wind Speed Data for the Design of Buildings and Other Structures. PB84-178847	400,077
SOLAR SCREENS Effectiveness of Solar Shading for an Office Building. PB84-217918	400,082	THERMAL ENERGY STORAGE EQUIPMENT Phase Change Thermal Energy Storage and the Model Building Codes. PB85-111201	400,024	Fastest-Mile Wind Speeds in Hurricane Alicia. PB84-220771	400,004
SOLAR WATER HEATING Test Methods and Standards Development for Active Solar Heating and Cooling Systems. PB84-217447	400,032			Multidirectional Analysis of Extreme Wind Speed Data. PB85-144020	400,099
Research Priorities for Improving the Effectiveness of					

TITLE INDEX

Title Index

- Air Flow Calibration of Building Pressurization Devices.
PB84-217025 400,080 PC A03/MF A01
- Air Quality Criteria for Storage of Paper-Based Archival Records.
PB84-135607 400,029 PC A06/MF A01
- Building Technology Project Summaries, 1983-1984 (of the National Bureau of Standards (NEL) Center for Building Technology).
PB84-222249 400,089 PC A07/MF A01
- Building Technology Publications, Supplement 8: 1983.
PB84-237197 400,092 PC A05/MF A01
- Calibration of Temperature Measurement Systems Installed in Buildings.
PB84-154004 400,030 PC A05/MF A01
- Choosing Among Intense Acoustic Background Stimuli - Acoustic Menu.
PB85-145381 400,110 Not available NTIS
- CIB (Conseil International du Batiment) National Committees as a Mechanism for Communication: An Example.
PB84-221258 400,085 Not available NTIS
- Civil Engineering Standards for the Computer Age.
PB85-170587 400,014 Not available NTIS
- Climate Data Abbreviation for the Computerized Calculation of Heating and Cooling Requirements in Buildings.
PB85-145407 400,048 Not available NTIS
- Comparative Analysis of Thermographic Inspections Performed on Retrofitted Homes.
PB84-142231 400,072 PC A09/MF A01
- Comparison of Analytical with Experimental Internal Strain Distribution for the Pullout Test.
PB84-221969 400,056 Not available NTIS
- Conduction Transfer Functions and the Heat Balance Method for Thermal Simulation of Multiroom Buildings.
PB84-223262 400,090 Not available NTIS
- Construction Research in Japan.
PB85-106839 400,094 PC A03/MF A01
- Control Algorithms for Building Management and Control Systems - Hot Deck/Cold Deck/Supply Air Reset, Day/Night Setback, Ventilation Purging, and Hot and Chilled Water Reset.
PB84-217413 400,081 PC A04/MF A01
- Criteria for Assuring Safety during Erection of Concrete Shell Structures.
PB85-118388 400,071 Not available NTIS
- Criteria for Mechanical Systems in Multifamily Buildings for Residential Weatherization Options.
PB85-120129 400,043 PC A05/MF A01
- Criteria for Recommending Lighting Levels.
PB85-143311 400,046 Not available NTIS
- Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities.
PB85-121465 400,007 PC A04/MF A01
- Daylighting Computation Procedure for Use in DOE-2 and Other Dynamic Building Energy Analysis Programs.
PB84-246032 400,040 Not available NTIS
- Deformation and Failure in Large-Scale Pullout Tests.
PB84-221977 400,057 Not available NTIS
- Demand Limiting Algorithms for Energy Management and Control Systems.
PB84-167675 400,018 PC A05/MF A01
- Directional Extreme Wind Speed Data for the Design of Buildings and Other Structures.
PB84-178847 400,077 PC A07/MF A01
- Documentation and Assessment of the GSA/PBS (General Services Administration/Public Buildings Service) Building Systems Program: Final Report and Recommendations.
PB84-155894 400,073 PC A05/MF A01
- Dynamic Response of Structural Systems Subjected to Horizontal Propagating Shear Waves.
PB85-144939 400,100 Not available NTIS
- Economizer Algorithms for Energy Management and Control Systems.
PB84-178284 400,076 PC A05/MF A01
- Effective Use of Daylighting.
PB84-221985 400,034 Not available NTIS
- Effectiveness of Solar Shading for an Office Building.
PB84-217918 400,082 PC A06/MF A01
- Effects of Thermal Insulation Penetrating Electrical Boxes.
PB84-239334 400,015 Not available NTIS
- Evaluation of Ettringite and Related Compounds for Use in Solar Energy Storage.
PB85-146876 400,025 PC A03/MF A01
- Evaluation of Infrared Reflectance as a Technique for Measuring Absorber Materials Degradation.
PB85-105488 400,019 PC A03/MF A01
- Evaluation of the Sulfate Resistance of Cements in a Controlled Environment.
PB85-123628 400,064 Not available NTIS
- Experimental Evaluation of Engine-Driven Heat Pump Systems.
PB85-120657 400,044 Not available NTIS
- Fastest-Mile Wind Speeds in Hurricane Alicia.
PB84-220771 400,004 PC A04/MF A01
- Field Hydraulic Performance of One- and Two-Story Residential Plumbing Systems with Reduced-Size Vents.
PB85-131878 400,070 PC A06/MF A01
- Fortran 77 Computer Program for Test Procedure Calculations of Vented Heaters.
PB85-109627 400,042 PC A04/MF A01
- Impact of Building Codes and Regulations on Indoor Air Quality.
PB85-144905 400,047 Not available NTIS
- Impact Resistance of Concrete.
PB84-229491 400,058 Not available NTIS
- Influence of Degree Day Base Temperature on Building Energy Prediction.
PB85-120715 400,022 Not available NTIS
- Influence of Vertical Compressive Stress on Shear Resistance of Concrete Block Masonry Walls.
PB85-119337 400,063 PC A04/MF A01
- Innovation in Residential Construction.
PB85-143295 400,006 Not available NTIS
- Interim Design Guidelines for Automated Offices.
PB85-100410 400,008 PC A06/MF A01
- Investigation of East Chicago Ramp Collapse.
PB84-227404 400,055 Not available NTIS
- Laboratory Evaluation of the Steady-State and Part Load Performance of Absorption Type Heating and Cooling Equipment.
PB84-182146 400,031 PC A05/MF A01
- Laboratory Study of Flaw Detection in Concrete by the Pulse-Echo Method.
PB85-141505 400,067 Not available NTIS
- Line Source and Site Characterizations for Defining the Sound Transmission Loss of Building Facades.
PB84-227040 400,109 Not available NTIS
- Materials Research Activities at the National Bureau of Standards (1975-1982) Pertaining to Active Solar Heating and Cooling Systems.
PB84-154780 400,016 PC A04/MF A01
- Measurement Techniques for Evaluating Solar Reflector Materials.
PB85-119469 400,021 PC A04/MF A01
- Measurements of Sky Luminance, Sky Illuminance, and Horizontal Solar Radiation.
PB85-145423 400,003 Not available NTIS
- Mechanical Performance Model for Roofing Membranes.
PB85-129401 400,065 Not available NTIS
- Modular Data Acquisition and Display Software System for a Laboratory Environment.
PB84-217892 400,013 PC A04/MF A01
- Multi-Year Plan for Experimental Systems Research-Passive and Hybrid Solar Energy Program.
PB85-146868 400,023 PC A04/MF A01
- Multidirectional Analysis of Extreme Wind Speed Data.
PB85-144020 400,099 Not available NTIS
- National Bureau of Standards Passive Solar Test Facility - Instrumentation and Site Handbook.
PB85-100451 400,104 PC A05/MF A01
- NBS (National Bureau of Standards) Daylight Availability Database.
PB84-245745 400,005 PC A04/MF A01
- NBS (National Bureau of Standards) Solar Collector Durability/Reliability Test Program: Final Report.
PB85-113603 400,020 PC A08/MF A01
- NBS (National Bureau of Standards) Tri-Directional Test Facility.
PB84-217462 400,103 PC A03/MF A01
- Nondestructive Corrosion Detection Under Organic Films Using Infrared Thermography.
PB84-225416 400,027 Not available NTIS
- Offshore Concrete Structures in the Arctic: Research Needs.
PB84-218353 400,083 PC A04/MF A01
- On-Site Calibration of Flow Metering Systems Installed in Buildings.
PB84-160993 400,074 PC A08/MF A01
- Optical Properties of Black Chrome - A Model for Predicting the Effect of Exposure to Elevated Temperature.
PB85-142784 400,028 Not available NTIS
- Performance and Selection Criteria for Mechanical Energy Saving Retrofit Options for Single-Family Residences.
PB84-226075 400,037 PC A05/MF A01
- Performance Criteria for Restoration Coatings for Porcelain Enamel Surfaces.
PB84-141787 400,026 PC A03/MF A01
- Performance Criteria for Solar Heating and Cooling Systems in Commercial Buildings.
PB84-224344 400,036 PC A11/MF A01
- Performances of Different Passive Solar Systems at the NBS (National Bureau of Standards) Test Facility.
PB85-141430 400,045 Not available NTIS
- Phase Change Thermal Energy Storage and the Model Building Codes.
PB85-111201 400,024 PC A13/MF A01
- Practical Approximations of Peak Wave Forces.
PB85-138592 400,010 PC A04/MF A01
- Prediccion de la Resistencia del Concreto a Partir de su Madurez (Method for Prediction of Strength and Resistance of Concrete Based on the Maturity Concept).
PB85-115558 400,062 Not available NTIS
- Probabilistic Design of Cladding Glass Subjected to Wind Loads.
PB84-221712 400,002 Not available NTIS
- Probability - Based Design for Engineered Masonry Construction.
PB85-137420 400,097 Not available NTIS
- Probability-Based Loading Criteria for Codified Design.
PB84-221365 400,086 Not available NTIS
- Probability-Based Wind Load Description for Cladding and Structural Members Sensitive to Wind Direction Effects: A Survey of Recent Research.
PB84-221456 400,087 Not available NTIS
- Procedure for Tristimulus Color Measurements on Building Stone.
PB85-133981 400,066 PC A03/MF A01
- Procedures for Determining Annual Efficiency for Furnaces and Vented Household Heaters with Modulating-Type Controls.
PB84-243997 400,039 Not available NTIS
- Pulse-Echo Method for Flaw Detection in Concrete.
PB84-234509 400,060 PC A03/MF A01
- Recent Indoor Air Quality Research in the United States.
PB84-222108 400,054 Not available NTIS
- Reliability Based Criteria for Reinforced Concrete Design.
PB85-123651 400,095 Not available NTIS
- Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
PB85-153443 400,050 PC A05/MF A01
- Responses to Questions by the General Accounting Office Related to Construction of the Sunshine Skyway Bridge.
PB84-218072 400,053 PC A03/MF A01
- Ring-on-Ring Tests and Load Capacity of Cladding Glass.
PB85-106391 400,061 PC A04/MF A01
- Role of Color in Lighting for Meat and Poultry Inspection.
PB84-177823 400,009 PC A05/MF A01
- Selection, Procurement, and Description of Salem Limestone Samples Used to Study the Effects of Acid Rain.
PB84-231067 400,059 PC A02/MF A01
- Short Duration Winter-Time Performances of Different Passive Solar Systems.
PB85-163392 400,052 PC A04/MF A01
- Simplified Methods for Determining Seasonal Heat Loss from Uninsulated Slab-on-Grade Floors.
PB84-221621 400,033 Not available NTIS
- Size Effect in Simple Shear Testing.
PB85-137719 400,012 PC A04/MF A01

Solar Collector Test Procedures: Development of a Method to Refer Measured Efficiencies to Standardized Test Conditions.
PB84-165299 400,017 PC A07/MF A01

Some Statistical Aspects of Wind and Snow Loading.
PB85-144947 400,101 Not available NTIS

Statistical Tests of Environmental Load Data.
PB85-136232 400,096 Not available NTIS

Status of Building Code Provisions for Solar Energy Systems.
PB84-171610 400,075 PC A07/MF A01

Strategies for Energy Conservation for a School Building.
PB84-224302 400,035 PC A05/MF A01

Structural Reliability Fundamentals and Their Application to Offshore Structures.
PB85-109609 400,069 PC A03/MF A01

Structural Serviceability. Floor Vibrations.
PB84-218882 400,084 Not available NTIS

Test Methods and Standards Development for Active Solar Heating and Cooling Systems.
PB84-217447 400,032 PC A07/MF A01

Test Methods for the Direct Measurement of Stack Energy Loss during the Off-Period of Space Heating Equipment.
PB85-110427 400,105 PC A04/MF A01

Test Procedures for Rating Residential Heating and Cooling Absorption Equipment.
PB84-216514 400,078 PC A05/MF A01

Test Results and a Recommended Test Procedure for Heat Traps.
PB84-241496 400,038 PC A03/MF A01

Tether Deformation and Tension Leg Platform Surge.
PB84-226117 400,091 Not available NTIS

Thermal Performance Testing of Passive Solar Components in the NBS (National Bureau of Standards) Calorimeter.
PB85-119345 400,106 PC A04/MF A01

Thermographic Inspection of Exterior Wall Insulation Retrofits.
PB85-102788 400,041 Not available NTIS

Thickness Effect in Low-Density Insulation.
PB85-163376 400,051 PC A03/MF A01

Tornado-Borne Missile Speed Probabilities.
PB85-108611 400,108 Not available NTIS

Turbulent Wind Effects on Tension Leg Platform Surge.
PB84-221944 400,088 Not available NTIS

Use of 'Corner Microphones' for Sound Power Measurements in a Reverberation Chamber.
PB84-216985 400,102 Not available NTIS

Use of Hazard Pictorials/Symbols in the Minerals Industry.
PB84-165877 400,011 PC A09/MF A01

Uses of Waste Materials and By-Products in Construction.
PB85-142339 400,068 Not available NTIS

Ventilation Concepts for Office Buildings.
PB85-151561 400,049 Not available NTIS

Weatherization of Residences: Criteria for Retrofit Materials and Products.
PB84-241728 400,093 PC A04/MF A01

West Virginia Cooling Tower Collapse Caused by Premature Form Removal.
PB85-140424 400,098 Not available NTIS

Wind Loading and Strength of Cladding Glass.
PB84-221068 400,001 Not available NTIS

Wind-Tunnel Study of Wind Loading on a Compliant Offshore Platform.
PB84-216522 400,079 PC A03/MF A01

Wind Tunnels Applied to Wind Engineering in Japan.
PB85-136810 400,107 Not available NTIS

**NTIS
ORDER/REPORT
NUMBER INDEX**

NTIS Order/Report Number Index

NBS-BSS-153

Calibration of Temperature Measurement Systems Installed in Buildings.
PB84-154004 400,030 PC A05/MF A01

NBS-BSS-159

On-Site Calibration of Flow Metering Systems Installed in Buildings.
PB84-160993 400,074 PC A08/MF A01

NBS-BSS-160

Directional Extreme Wind Speed Data for the Design of Buildings and Other Structures.
PB84-178847 400,077 PC A07/MF A01

NBS/BSS-161

Effectiveness of Solar Shading for an Office Building.
PB84-217918 400,082 PC A06/MF A01

NBS/BSS-162

Ring-on-Ring Tests and Load Capacity of Cladding Glass.
PB85-106391 400,061 PC A04/MF A01

NBS-GCR-84-459

Solar Collector Test Procedures: Development of a Method to Refer Measured Efficiencies to Standardized Test Conditions.
PB84-165299 400,017 PC A07/MF A01

NBS-GCR-84-460

Status of Building Code Provisions for Solar Energy Systems.
PB84-171610 400,075 PC A07/MF A01

NBS-GCR-84-465

Wind-Tunnel Study of Wind Loading on a Compliant Off-shore Platform.
PB84-216522 400,079 PC A03/MF A01

NBS/GCR-84/475

Measurement Techniques for Evaluating Solar Reflector Materials.
PB85-119469 400,021 PC A04/MF A01

NBS/GCR-84/478

Size Effect in Simple Shear Testing.
PB85-137719 400,012 PC A04/MF A01

NBS/GCR-84/481

Practical Approximations of Peak Wave Forces.
PB85-138592 400,010 PC A04/MF A01

NBS/SP-446-8

Building Technology Project Summaries, 1983-1984 (of the National Bureau of Standards (NEL) Center for Building Technology).
PB84-222249 400,089 PC A07/MF A01

NBS/SP-457/8

Building Technology Publications, Supplement 8: 1983.
PB84-237197 400,092 PC A05/MF A01

NBS/TN-1187

Performance Criteria for Solar Heating and Cooling Systems in Commercial Buildings.
PB84-224344 400,036 PC A11/MF A01

NBS/TN-1188

Modular Data Acquisition and Display Software System for a Laboratory Environment.
PB84-217892 400,013 PC A04/MF A01

NBS/TN-1192

Offshore Concrete Structures in the Arctic: Research Needs.
PB84-218353 400,083 PC A04/MF A01

NBS/TN-1196

NBS (National Bureau of Standards) Solar Collector Durability/Reliability Test Program: Final Report.
PB85-113603 400,020 PC A08/MF A01

NBS/TN-1197

Fastest-Mile Wind Speeds in Hurricane Alicia.
PB84-220771 400,004 PC A04/MF A01

NBS/TN-1199

Pulse-Echo Method for Flaw Detection in Concrete.
PB84-234509 400,060 PC A03/MF A01

NBS/TN-1201

Weatherization of Residences: Criteria for Retrofit Materials and Products.
PB84-241728 400,083 PC A04/MF A01

NBSIR-83-2701

Comparative Analysis of Thermographic Inspections Performed on Retrofitted Homes.
PB84-142231 400,072 PC A09/MF A01

NBSIR-83-2732

Use of Hazard Pictorials/Symbols in the Minerals Industry.
PB84-165877 400,011 PC A09/MF A01

NBSIR-83-2777

Documentation and Assessment of the GSA/PBS (General Services Administration/Public Buildings Service) Building Systems Program: Final Report and Recommendations.
PB84-155894 400,073 PC A05/MF A01

NBSIR-83-2781

Performance Criteria for Restoration Coatings for Porcelain Enamel Surfaces.
PB84-141787 400,026 PC A03/MF A01

NBSIR-83-2782

Materials Research Activities at the National Bureau of Standards (1975-1982) Pertaining to Active Solar Heating and Cooling Systems.
PB84-154780 400,016 PC A04/MF A01

NBSIR-83-2795

Air Quality Criteria for Storage of Paper-Based Archival Records.
PB84-135607 400,029 PC A06/MF A01

NBSIR-84-2816

Laboratory Evaluation of the Steady-State and Part Load Performance of Absorption Type Heating and Cooling Equipment.
PB84-182146 400,031 PC A05/MF A01

NBSIR-84-2826

Demand Limiting Algorithms for Energy Management and Control Systems.
PB84-167675 400,018 PC A05/MF A01

NBSIR-84-2829

Role of Color in Lighting for Meat and Poultry Inspection.
PB84-177823 400,009 PC A05/MF A01

NBSIR-84-2831

Strategies for Energy Conservation for a School Building.
PB84-224302 400,035 PC A05/MF A01

NBSIR-84-2832

Economizer Algorithms for Energy Management and Control Systems.
PB84-178284 400,076 PC A05/MF A01

NBSIR-84/2833

Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities.
PB85-121465 400,007 PC A04/MF A01

NBSIR-84/2834

Construction Research in Japan.
PB85-106839 400,094 PC A03/MF A01

NBSIR-84-2845

Test Methods and Standards Development for Active Solar Heating and Cooling Systems.
PB84-217447 400,032 PC A07/MF A01

NBSIR-84-2846

Control Algorithms for Building Management and Control Systems -- Hot Deck/Cold Deck/Supply Air Reset, Day/Night Setback, Ventilation Purging, and Hot and Chilled Water Reset.
PB84-217413 400,081 PC A04/MF A01

NBSIR-84-2849

Air Flow Calibration of Building Pressurization Devices.
PB84-217025 400,080 PC A03/MF A01

NBSIR-84/2851

Test Results and a Recommended Test Procedure for Heat Traps.
PB84-241496 400,038 PC A03/MF A01

NBSIR-84/2859

NBS (National Bureau of Standards) Daylight Availability Database.
PB84-245745 400,005 PC A04/MF A01

NBSIR-84/2860

Field Hydraulic Performance of One- and Two-Story Residential Plumbing Systems with Reduced-Size Vents.
PB85-131878 400,070 PC A06/MF A01

NBSIR-84-2867

Test Procedures for Rating Residential Heating and Cooling Absorption Equipment.
PB84-216514 400,078 PC A05/MF A01

NBSIR-84/2869

Test Methods for the Direct Measurement of Stack Energy Loss during the Off-Period of Space Heating Equipment.
PB85-110427 400,105 PC A04/MF A01

NBSIR-84-2870

Performance and Selection Criteria for Mechanical Energy Saving Retrofit Options for Single-Family Residences.
PB84-226075 400,037 PC A05/MF A01

NBSIR-84-2879

NBS (National Bureau of Standards) Tri-Directional Test Facility.
PB84-217462 400,103 PC A03/MF A01

NBSIR-84/2892

Responses to Questions by the General Accounting Office Related to Construction of the Sunshine Skyway Bridge.
PB84-218072 400,053 PC A03/MF A01

NBSIR-84/2905

Selection, Procurement, and Description of Salem Limestone Samples Used to Study the Effects of Acid Rain.
PB84-231067 400,059 PC A02/MF A01

NBSIR-84/2906

Thickness Effect in Low-Density Insulation.
PB85-163376 400,051 PC A03/MF A01

NBSIR-84/2908

Interim Design Guidelines for Automated Offices.
PB85-100410 400,008 PC A06/MF A01

NBSIR-84/2909

Phase Change Thermal Energy Storage and the Model Building Codes.
PB85-111201 400,024 PC A13/MF A01

NBSIR-84/2911

National Bureau of Standards Passive Solar Test Facility - Instrumentation and Site Handbook.
PB85-100451 400,104 PC A05/MF A01

NBSIR-84/2916

Evaluation of Infrared Reflectance as a Technique for Measuring Absorber Materials Degradation.
PB85-108488 400,019 PC A03/MF A01

NBSIR-84/2918

Fortran 77 Computer Program for Test Procedure Calculations of Vented Heaters.
PB85-109627 400,042 PC A04/MF A01

NBSIR-84/2920

Thermal Performance Testing of Passive Solar Components in the NBS (National Bureau of Standards) Calorimeter.
PB85-119345 400,106 PC A04/MF A01

NBSIR-84/2921

Structural Reliability Fundamentals and Their Application to Offshore Structures.
PB85-109809 400,069 PC A03/MF A01

NBSIR-84/2929

Influence of Vertical Compressive Stress on Shear Resistance of Concrete Block Masonry Walls.
PB85-119337 400,063 PC A04/MF A01

NBSIR-84/2930

Short Duration Winter-Time Performances of Different Passive Solar Systems.
PB85-163392 400,052 PC A04/MF A01

NBSIR-84/2939

Criteria for Mechanical Systems in Multifamily Buildings for Residential Weatherization Options.
PB85-120129 400,043 PC A05/MF A01

NBSIR-84/2942

Evaluation of Ettringite and Related Compounds for Use in Solar Energy Storage.
PB85-146876 400,025 PC A03/MF A01

NBSIR-84/2961

Procedure for Tristimulus Color Measurements on Building Stone.
PB85-133981 400,066 PC A03/MF A01

NBSIR-84/2972

Multi-Year Plan for Experimental Systems Research-Passive and Hybrid Solar Energy Program.
PB85-146868 400,023 PC A04/MF A01

NBSIR-84/2980

Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
PB85-153443 400,050 PC A05/MF A01

PB84-135607

Air Quality Criteria for Storage of Paper-Based Archival Records.
PB84-135607 400,029 PC A06/MF A01

PB84-141787

Performance Criteria for Restoration Coatings for Porcelain Enamel Surfaces.
PB84-141787 400,026 PC A03/MF A01

PB84-142231

Comparative Analysis of Thermographic Inspections Performed on Retrofitted Homes.
PB84-142231 400,072 PC A09/MF A01

PB84-154004

Calibration of Temperature Measurement Systems Installed in Buildings.
PB84-154004 400,030 PC A05/MF A01

PB84-154780

Materials Research Activities at the National Bureau of Standards (1975-1982) Pertaining to Active Solar Heating and Cooling Systems.
PB84-154780 400,016 PC A04/MF A01

PB84-155894

Documentation and Assessment of the GSA/PBS (General Services Administration/Public Buildings Service) Building Systems Program: Final Report and Recommendations.
PB84-155894 400,073 PC A05/MF A01

PB84-160993

On-Site Calibration of Flow Metering Systems Installed in Buildings.
PB84-160993 400,074 PC A08/MF A01

PB84-165299

Solar Collector Test Procedures: Development of a Method to Refer Measured Efficiencies to Standardized Test Conditions.
PB84-165299 400,017 PC A07/MF A01

PB84-165877

Use of Hazard Pictorials/Symbols in the Minerals Industry.
PB84-165877 400,011 PC A09/MF A01

PB84-167675

Demand Limiting Algorithms for Energy Management and Control Systems.
PB84-167675 400,018 PC A05/MF A01

- PB84-171610**
Status of Building Code Provisions for Solar Energy Systems.
PB84-171610 400,075 PC A07/MF A01
- PB84-177823**
Role of Color in Lighting for Meat and Poultry Inspection.
PB84-177823 400,009 PC A05/MF A01
- PB84-178284**
Economizer Algorithms for Energy Management and Control Systems.
PB84-178284 400,076 PC A05/MF A01
- PB84-178847**
Directional Extreme Wind Speed Data for the Design of Buildings and Other Structures.
PB84-178847 400,077 PC A07/MF A01
- PB84-182146**
Laboratory Evaluation of the Steady-State and Part Load Performance of Absorption Type Heating and Cooling Equipment.
PB84-182146 400,031 PC A05/MF A01
- PB84-216514**
Test Procedures for Rating Residential Heating and Cooling Absorption Equipment.
PB84-216514 400,078 PC A05/MF A01
- PB84-216522**
Wind-Tunnel Study of Wind Loading on a Compliant Off-shore Platform.
PB84-216522 400,079 PC A03/MF A01
- PB84-216985**
Use of 'Corner Microphones' for Sound Power Measurements in a Reverberation Chamber.
PB84-216985 400,102 Not available NTIS
- PB84-217025**
Air Flow Calibration of Building Pressurization Devices.
PB84-217025 400,080 PC A03/MF A01
- PB84-217413**
Control Algorithms for Building Management and Control Systems -- Hot Deck/Cold Deck/Supply Air Reset, Day/Night Setback, Ventilation Purging, and Hot and Chilled Water Reset.
PB84-217413 400,081 PC A04/MF A01
- PB84-217447**
Test Methods and Standards Development for Active Solar Heating and Cooling Systems.
PB84-217447 400,032 PC A07/MF A01
- PB84-217462**
NBS (National Bureau of Standards) Tri-Directional Test Facility.
PB84-217462 400,103 PC A03/MF A01
- PB84-217892**
Modular Data Acquisition and Display Software System for a Laboratory Environment.
PB84-217892 400,013 PC A04/MF A01
- PB84-217918**
Effectiveness of Solar Shading for an Office Building.
PB84-217918 400,082 PC A06/MF A01
- PB84-218072**
Responses to Questions by the General Accounting Office Related to Construction of the Sunshine Skyway Bridge.
PB84-218072 400,053 PC A03/MF A01
- PB84-218353**
Offshore Concrete Structures in the Arctic: Research Needs.
PB84-218353 400,083 PC A04/MF A01
- PB84-218882**
Structural Serviceability. Floor Vibrations.
PB84-218882 400,084 Not available NTIS
- PB84-220771**
Fastest-Mile Wind Speeds in Hurricane Alicia.
PB84-220771 400,004 PC A04/MF A01
- PB84-221068**
Wind Loading and Strength of Cladding Glass.
PB84-221068 400,007 Not available NTIS
- PB84-221258**
CIB (Conseil International du Batiment) National Committees as a Mechanism for Communication: An Example.
PB84-221258 400,085 Not available NTIS
- PB84-221365**
Probability-Based Loading Criteria for Codified Design.
PB84-221365 400,086 Not available NTIS
- PB84-221456**
Probability-Based Wind Load Description for Cladding and Structural Members Sensitive to Wind Direction Effects: A Survey of Recent Research.
PB84-221456 400,087 Not available NTIS
- PB84-221621**
Simplified Methods for Determining Seasonal Heat Loss from Uninsulated Slab-on-Grade Floors.
PB84-221621 400,033 Not available NTIS
- PB84-221712**
Probabilistic Design of Cladding Glass Subjected to Wind Loads.
PB84-221712 400,002 Not available NTIS
- PB84-221944**
Turbulent Wind Effects on Tension Leg Platform Surge.
PB84-221944 400,088 Not available NTIS
- PB84-221969**
Comparison of Analytical with Experimental Internal Strain Distribution for the Pullout Test.
PB84-221969 400,056 Not available NTIS
- PB84-221977**
Deformation and Failure in Large-Scale Pullout Tests.
PB84-221977 400,057 Not available NTIS
- PB84-221985**
Effective Use of Daylighting.
PB84-221985 400,034 Not available NTIS
- PB84-222108**
Recent Indoor Air Quality Research in the United States.
PB84-222108 400,054 Not available NTIS
- PB84-222249**
Building Technology Project Summaries, 1983-1984 (of the National Bureau of Standards (NEL) Center for Building Technology).
PB84-222249 400,089 PC A07/MF A01
- PB84-223262**
Conduction Transfer Functions and the Heat Balance Method for Thermal Simulation of Multiroom Buildings.
PB84-223262 400,090 Not available NTIS
- PB84-224302**
Strategies for Energy Conservation for a School Building.
PB84-224302 400,035 PC A05/MF A01
- PB84-224344**
Performance Criteria for Solar Heating and Cooling Systems in Commercial Buildings.
PB84-224344 400,036 PC A11/MF A01
- PB84-225416**
Nondestructive Corrosion Detection Under Organic Films Using Infrared Thermography.
PB84-225416 400,027 Not available NTIS
- PB84-226075**
Performance and Selection Criteria for Mechanical Energy Saving Retrofit Options for Single-Family Residences.
PB84-226075 400,037 PC A05/MF A01
- PB84-226117**
Tether Deformation and Tension Leg Platform Surge.
PB84-226117 400,091 Not available NTIS
- PB84-227040**
Line Source and Site Characterizations for Defining the Sound Transmission Loss of Building Facades.
PB84-227040 400,109 Not available NTIS
- PB84-227404**
Investigation of East Chicago Ramp Collapse.
PB84-227404 400,055 Not available NTIS
- PB84-229491**
Impact Resistance of Concrete.
PB84-229491 400,058 Not available NTIS
- PB84-231067**
Selection, Procurement, and Description of Salem Limestone Samples Used to Study the Effects of Acid Rain.
PB84-231067 400,059 PC A02/MF A01
- PB84-234509**
Pulse-Echo Method for Flaw Detection in Concrete.
PB84-234509 400,060 PC A03/MF A01
- PB84-237197**
Building Technology Publications, Supplement 8: 1983.
PB84-237197 400,092 PC A05/MF A01
- PB84-239334**
Effects of Thermal Insulation Penetrating Electrical Boxes.
PB84-239334 400,015 Not available NTIS
- PB84-241496**
Test Results and a Recommended Test Procedure for Heat Traps.
PB84-241496 400,038 PC A03/MF A01
- PB84-241728**
Weatherization of Residences: Criteria for Retrofit Materials and Products.
PB84-241728 400,093 PC A04/MF A01
- PB84-243997**
Procedures for Determining Annual Efficiency for Furnaces and Vented Household Heaters with Modulating-Type Controls.
PB84-243997 400,039 Not available NTIS
- PB84-245745**
NBS (National Bureau of Standards) Daylight Availability Database.
PB84-245745 400,005 PC A04/MF A01
- PB84-246032**
Daylighting Computation Procedure for Use in DOE-2 and Other Dynamic Building Energy Analysis Programs.
PB84-246032 400,040 Not available NTIS
- PB85-100410**
Interim Design Guidelines for Automated Offices.
PB85-100410 400,008 PC A06/MF A01
- PB85-100451**
National Bureau of Standards Passive Solar Test Facility - Instrumentation and Site Handbook.
PB85-100451 400,104 PC A05/MF A01
- PB85-102788**
Thermographic Inspection of Exterior Wall Insulation Retrofits.
PB85-102788 400,041 Not available NTIS
- PB85-106391**
Ring-on-Ring Tests and Load Capacity of Cladding Glass.
PB85-106391 400,061 PC A04/MF A01
- PB85-106839**
Construction Research in Japan.
PB85-106839 400,094 PC A03/MF A01
- PB85-108488**
Evaluation of Infrared Reflectance as a Technique for Measuring Absorber Materials Degradation.
PB85-108488 400,019 PC A03/MF A01
- PB85-108611**
Tornado-Borne Missile Speed Probabilities.
PB85-108611 400,108 Not available NTIS
- PB85-109627**
Fortran 77 Computer Program for Test Procedure Calculations of Vented Heaters.
PB85-109627 400,042 PC A04/MF A01
- PB85-109809**
Structural Reliability Fundamentals and Their Application to Offshore Structures.
PB85-109809 400,069 PC A03/MF A01
- PB85-110427**
Test Methods for the Direct Measurement of Stack Energy Loss during the Off-Period of Space Heating Equipment.
PB85-110427 400,105 PC A04/MF A01
- PB85-111201**
Phase Change Thermal Energy Storage and the Model Building Codes.
PB85-111201 400,024 PC A13/MF A01
- PB85-113603**
NBS (National Bureau of Standards) Solar Collector Durability/Reliability Test Program: Final Report.
PB85-113603 400,020 PC A08/MF A01
- PB85-115558**
Prediccion de la Resistencia del Concreto a Partir de su Madurez (Method for Prediction of Strength and Resistance of Concrete Based on the Maturity Concept).
PB85-115558 400,062 Not available NTIS
- PB85-118388**
Criteria for Assuring Safety during Erection of Concrete Shell Structures.
PB85-118388 400,071 Not available NTIS
- PB85-119337**
Influence of Vertical Compressive Stress on Shear Resistance of Concrete Block Masonry Walls.
PB85-119337 400,063 PC A04/MF A01
- PB85-119345**
Thermal Performance Testing of Passive Solar Components in the NBS (National Bureau of Standards) Calorimeter.
PB85-119345 400,106 PC A04/MF A01
- PB85-119469**
Measurement Techniques for Evaluating Solar Reflector Materials.
PB85-119469 400,021 PC A04/MF A01
- PB85-120129**
Criteria for Mechanical Systems in Multifamily Buildings for Residential Weatherization Options.
PB85-120129 400,043 PC A05/MF A01
- PB85-120657**
Experimental Evaluation of Engine-Driven Heat Pump Systems.
PB85-120657 400,044 Not available NTIS
- PB85-120715**
Influence of Degree Day Base Temperature on Building Energy Prediction.
PB85-120715 400,022 Not available NTIS
- PB85-121465**
Data Requirements for the Seismic Review of LNG (Liquefied Natural Gas) Facilities.
PB85-121465 400,007 PC A04/MF A01
- PB85-123628**
Evaluation of the Sulfate Resistance of Cements in a Controlled Environment.
PB85-123628 400,064 Not available NTIS
- PB85-123651**
Reliability Based Criteria for Reinforced Concrete Design.
PB85-123651 400,095 Not available NTIS
- PB85-129401**
Mechanical Performance Model for Roofing Membranes.
PB85-129401 400,065 Not available NTIS

PB85-131878

Field Hydraulic Performance of One- and Two-Story Residential Plumbing Systems with Reduced-Size Vents.
PB85-131878 400,070 PC A06/MF A01

PB85-133981

Procedure for Tristimulus Color Measurements on Building Stone.
PB85-133981 400,066 PC A03/MF A01

PB85-136232

Statistical Tests of Environmental Load Data.
PB85-136232 400,096 Not available NTIS

PB85-136810

Wind Tunnels Applied to Wind Engineering in Japan.
PB85-136810 400,107 Not available NTIS

PB85-137420

Probability - Based Design for Engineered Masonry Construction.
PB85-137420 400,097 Not available NTIS

PB85-137719

Size Effect in Simple Shear Testing.
PB85-137719 400,012 PC A04/MF A01

PB85-138592

Practical Approximations of Peak Wave Forces.
PB85-138592 400,010 PC A04/MF A01

PB85-140424

West Virginia Cooling Tower Collapse Caused by Premature Form Removal.
PB85-140424 400,098 Not available NTIS

PB85-141430

Performances of Different Passive Solar Systems at the NBS (National Bureau of Standards) Test Facility.
PB85-141430 400,045 Not available NTIS

PB85-141505

Laboratory Study of Flaw Detection in Concrete by the Pulse-Echo Method.
PB85-141505 400,067 Not available NTIS

PB85-142339

Uses of Waste Materials and By-Products in Construction.
PB85-142339 400,068 Not available NTIS

PB85-142784

Optical-Properties of Black Chrome - A Model for Predicting the Effect of Exposure to Elevated Temperature.
PB85-142784 400,028 Not available NTIS

PB85-143295

Innovation in Residential Construction.
PB85-143295 400,006 Not available NTIS

PB85-143311

Criteria for Recommending Lighting Levels.
PB85-143311 400,046 Not available NTIS

PB85-144020

Multidirectional Analysis of Extreme Wind Speed Data.
PB85-144020 400,099 Not available NTIS

PB85-144905

Impact of Building Codes and Regulations on Indoor Air Quality.
PB85-144905 400,047 Not available NTIS

PB85-144939

Dynamic Response of Structural Systems Subjected to Horizontal Propagating Shear Waves.
PB85-144939 400,100 Not available NTIS

PB85-144947

Some Statistical Aspects of Wind and Snow Loading.
PB85-144947 400,101 Not available NTIS

PB85-145381

Choosing Among Intense Acoustic Background Stimuli - Acoustic Menu.
PB85-145381 400,110 Not available NTIS

PB85-145407

Climate Data Abbreviation for the Computerised Calculation of Heating and Cooling Requirements in Buildings.
PB85-145407 400,048 Not available NTIS

PB85-145423

Measurements of Sky Luminance, Sky Illuminance, and Horizontal Solar Radiation.
PB85-145423 400,003 Not available NTIS

PB85-146868

Multi-Year Plan for Experimental Systems Research-Passive and Hybrid Solar Energy Program.
PB85-146868 400,023 PC A04/MF A01

PB85-146876

Evaluation of Ettringite and Related Compounds for Use in Solar Energy Storage.
PB85-146876 400,025 PC A03/MF A01

PB85-151561

Ventilation Concepts for Office Buildings.
PB85-151561 400,049 Not available NTIS

PB85-153443

Research Priorities for Improving the Effectiveness of Active Solar Hot Water and Space Conditioning Systems.
PB85-153443 400,050 PC A05/MF A01

PB85-163376

Thickness Effect in Low-Density Insulation.
PB85-163376 400,051 PC A03/MF A01

PB85-163392

Short Duration Winter-Time Performances of Different Passive Solar Systems.
PB85-163392 400,052 PC A04/MF A01

PB85-170587

Civil Engineering Standards for the Computer Age.
PB85-170587 400,014 Not available NTIS

APPENDIX A. DEPOSITORY LIBRARIES IN THE UNITED STATES

ALABAMA

Alexander City

Alexander City State Junior College Thomas S. Russell Library (1967)*

Auburn

Auburn University Ralph Brown Draughon Library (1907)

Birmingham

Birmingham Public Library (1895)
Birmingham-Southern College Library (1932)
Jefferson State Junior College James B. Allen Library (1970)
Miles College C. A. Kirkendall Learning Resource Center (1980)
Samford University Library (1884)

Enterprise

Enterprise State Junior College Learning Resources Center (1967)

Fayette

Brewer State Junior College Learning Resources Center Library (1979)

Florence

University of North Alabama Collier Library (1932)

Gadsden

Gadsden Public Library (1963)

Huntsville

University of Alabama in Huntsville Library (1964)

Jacksonville

Jacksonville State University Library (1929)

Mobile

Mobile Public Library (1963)
Spring Hill College Thomas Byrne Memorial Library (1937)
University of South Alabama Library (1968)

Montgomery

Alabama State Department of Archives and History Library (1884)
Alabama Supreme Court and State Law Library (1884)
Auburn University at Montgomery Library (1971) REGIONAL
Air University Library Maxwell Air Force Base (1963)

Normal

Alabama Agricultural and Mechanical University J. F. Drake Memorial Learning Resources Center (1963)

Troy

Troy State University Library (1963)

Tuskegee Institute

Tuskegee Institute Hollis Burke Frissell Library (1907)

University

University of Alabama Library (1860) REGIONAL
University of Alabama School of Law Library (1967)

ALASKA

Anchorage

Alaska Court Libraries (1973)
Anchorage Municipal Libraries Z. J. Loussac Public Library (1978)
University of Alaska at Anchorage Library (1961)
U.S. Department of Interior Alaska Resources Library (1981)
U.S. District Court Library (1983)

Fairbanks

University of Alaska Elmer E. Rasmuson Library (1922)

Juneau

Alaska State Library (1900)
University of Alaska-Juneau Library & Medical Services (1981)

Ketchikan

Ketchikan Community College Library (1970)

ARIZONA

Coolidge

Central Arizona College (1973)

* Year designated.

Flagstaff

Northern Arizona University Library (1937)

Mesa

Mesa Public Library (1983)

Phoenix

Department of Library Archives, and Public Records (unknown)
REGIONAL

Grand Canyon College Fleming Library (1978)

Phoenix Public Library (1917)

U.S. Court of Appeals (1984)

Prescott

Yavapai College Library (1976)

Tempe

Arizona State University College of Law Library (1977)

Arizona State University Library (1944)

Tucson

Tucson Public Library (1970)

University of Arizona Library (1907) REGIONAL

Yuma

Yuma City-County Library (1963)

ARKANSAS

Arkadelphia

Ouachita Baptist University Riley Library (1963)

Batesville

Arkansas College Library (1963)

Clarksville

College of the Ozarks Dobson Memorial Library (1925)

Conway

Hendrix College Olin C. Bailey Library (1903)

Fayetteville

University of Arkansas University Libraries (1907)

University of Arkansas School of Law Library (1978)

Little Rock

Arkansas State Library (1978) REGIONAL

Arkansas Supreme Court Library (1962)

Little Rock Public Library (1953)

University of Arkansas at Little Rock Library (1973)

University of Arkansas at Little Rock, School of Law Library (1979)

Magnolia

Southern Arkansas University Magale Library (1956)

Monticello

University of Arkansas at Monticello Library (1956)

Pine Bluff

University of Arkansas at Pine Bluff Watson Memorial Library (1976)

Russellville

Arkansas Tech University Tomlinson Library (1925)

Searcy

Harding University Beaumont Memorial Library (1963)

State University

Arkansas State University Dean B. Ellis Library (1913)

Walnut Ridge

Southern Baptist College Felix Goodson Library (1967)

CALIFORNIA

Anaheim

Anaheim Public Library (1963)

Arcadia

Arcadia Public Library (1975)

Arcata

Humboldt State University Library (1963)

Bakersfield

California State College Bakersfield Library (1974)

Kern County, Beale Memorial Library (1943)

Berkeley

University of California General Library (1907)

University of California Law Library (1963)

Carson

California State University Dominguez Hills Educational Resources
Center (1973)

Carson Regional Library (1973)

Chico

California State University Merriam Library (1962)

Claremont

Claremont Colleges' Libraries Honnold Library (1913)

Coalinga

West Hills Community College Library (1978)

Compton

Compton Public Library (1972)

Culver City

Culver City Library (1966)

Davis

University of California Shields Library (1953)

University of California at Davis Law Library (1972)

Downey

Downey City Library (1963)

Fresno

California State University, Fresno, Henry Madden Library (1962)

Fresno County Free Library (1920)

Fullerton

California State University, at Fullerton Library (1963)

Western State University College of Law Library (1984)

Garden Grove

Garden Grove Regional Library (1963)

Gardena

Gardena Public Library (1966)

Hayward

California State University at Hayward Library (1963)

Huntington Park

Huntington Park Library (1970)

Inglewood

Inglewood Public Library (1963)

Irvine

University of California at Irvine General Library (1963)

La Jolla

University of California at San Diego Central University Library (1963)

Lakewood

Angelo Iacoboni Public Library (1970)

Lancaster

Lancaster Library (1967)

La Verne

University of La Verne College of Law Library (1979)

Long Beach

California State University at Long Beach Library (1962)

Long Beach Public Library (1933)

Los Angeles

California State University at Los Angeles John F. Kennedy Memorial Library (1956)

Los Angeles County Law Library (1963)

Los Angeles Public Library (1891)

Loyola Marymount University Charles Von der Ahe Library (1933)

Loyola Law School Law Library (1979)

Occidental College Library (1941)

Southwestern University School of Law Library (1975)

University of California, University Research Library (1932)

University of California, Los Angeles Law Library (1958)

University of Southern California Doheny Memorial Library (1933)

University of Southern California Law Library (1978)

U.S. Court of Appeals 9th Circuit Library (1981)

Whittier College School of Law Library (1978)

Malibu

Pepperdine University Library (1963)

Menlo Park

Department of Interior Geological Survey Library (1962)

Montebello

Montebello Library (1966)

Monterey

U.S. Naval Postgraduate School Dudley Knox Library (1963)

Monterey Park

Bruggemeyer Memorial Library (1964)

Northridge

California State University at Northridge, Oviatt Library (1958)

Norwalk

Norwalk Public Library (1973)

Oakland

Mills College Library (1966)

Oakland Public Library (1923)

Ontario

Ontario City Library (1974)

Palm Springs

Palm Springs Public Library (1980)

Pasadena

California Institute of Technology Millikan Memorial Library (1933)
Pasadena Public Library (1963)

Pleasant Hill

Contra Costa County Library (1964)

Redding

Shasta County Library (1956)

Redlands

University of Redlands Armacost Library (1933)

Redwood City

Redwood City Public Library (1966)

Reseda

West Valley Regional Branch Library (1966)

Richmond

Richmond Public Library (1943)

Riverside

Riverside City and County Public Library (1947)
University of California at Riverside Library (1963)

Sacramento

California State Library (1895) REGIONAL
California State University at Sacramento Library (1963)
Sacramento County Law Library (1963)
Sacramento Public Library (1880)
University of the Pacific McGeorge School of Law Library (1978)

San Bernardino

San Bernardino County Law Library (1984)
San Bernardino County Library (1964)

San Diego

San Diego County Law Library (1973)
San Diego County Library (1966)
San Diego Public Library (1895)
San Diego State University Library (1962)
University of San Diego Kratter Law Library (1967)

San Francisco

Golden Gate University School of Law Library (1979)
Hastings College of Law Library (1972)
Mechanics' Institute Library (1889)

San Francisco Public Library (1889)
San Francisco State University J. Paul Leonard Library (1955)
Supreme Court of California Library (1979)
U.S. Court of Appeals Ninth Circuit Library (1971)
University of San Francisco Richard A. Gleeson Library (1963)

San Jose

San Jose State University Library (1962)

San Leandro

San Leandro Community Library Center (1961)

San Luis Obispo

California Polytechnic State University Robert E. Kennedy Library (1969)

San Rafael

Marin County Free Library (1975)

Santa Ana

Orange County Law Library (1975)
Santa Ana Public Library (1959)

Santa Barbara

University of California at Santa Barbara Library (1960)

Santa Clara

University of Santa Clara Orradre Library (1963)

Santa Cruz

University of California at Santa Cruz, McHenry Library (1963)

Santa Rosa

Sonoma County Library (1896)

Stanford

Stanford University Libraries (1895)
Stanford University Robert Crown Law Library (1978)

Stockton

Public Library of Stockton and San Joaquin County (1884)

Thousand Oaks

California Lutheran College Library (1964)

Torrance

Torrance Public Library (1969)

Turlock

California State College Stanislaus Library (1964)

Vallejo

Solano County Library, John F. Kennedy Library (1982)

Valencia

Valencia Regional Library (1972)

Ventura

Ventura County Library Services Agency (1975)

Visalia

Tulare County Free Library (1967)

Walnut

Mount San Antonio College Library (1966)

West Covina

West Covina Regional Library (1966)

Whittier

Whittier College Wardman Library (1963)

CANAL ZONE

Balboa Heights

Panama Canal Commission (1963)

COLORADO

Alamosa

Adams State College Learning Resources Center (1963)

Aurora

Aurora Public Library (1984)

Boulder

University of Colorado at Boulder Norlin Library (1879) REGIONAL

Colorado Springs

Colorado College Tutt Library (1880)
University of Colorado at Colorado Springs Library (1974)

Denver

Auraria Library (1978)
Colorado State Library (unknown)
Colorado Supreme Court Library (1978)
Denver Public Library (1884) REGIONAL
Department of the Interior Bureau of Reclamation Library (1962)
Regis College Dayton Memorial Library (1915)
U.S. Court of Appeals Tenth Circuit Library (1973)
University of Denver Penrose Library (1909)
University of Denver College of Law Westminster Law Library (1978)

Fort Collins

Colorado State University Libraries (1907)

Golden

Colorado School of Mines Arthur Lakes Library (1939)

Grand Junction

Mesa County Public Library (1975)

Greeley

University of Northern Colorado James A. Michener Library (1966)

Gunnison

Western State College Leslie J. Savage Library (1932)

La Junta

Otero Junior College Wheeler Library (1963)

Lakewood

Jefferson County Public Library Lakewood Library (1968)

Pueblo

Pueblo Library District (1893)
University of Southern Colorado Library (1965)

USAF Academy

U.S. Air Force Academy Academy Library—DFSEL-D (1956)

CONNECTICUT

Bridgeport

Bridgeport Public Library (1884)
University of Bridgeport School of Law Library Wahlstrom Library (1979)

Danbury

Western Connecticut State University Ruth A. Haas Library (1967)

Danielson

Quinebaug Valley Community College Audrey P. Beck Library (1975)

Enfield

Enfield Central Library (1967)

Hartford

Connecticut State Library (unknown) REGIONAL
Hartford Public Library (1945)
Trinity College Library (1895)
University of Connecticut School of Law Library (1978)

Middletown

Wesleyan University Olin Library (1906)

Mystic

Mystic Seaport Museum, Incorporated G. W. Blunt White Library (1964)

New Britain

Central Connecticut State University Elihu Burritt Library (1973)

New Haven

Southern Connecticut State University Hilton C. Buley Library (1968)
Yale Law Library (1981)
Yale University Seeley G. Mudd Library (1859)

New London

Connecticut College Library (1926)
U.S. Coast Guard Academy Library (1939)

Stamford

Ferguson Library Stamford's Public Library (1973)

Storrs

University of Connecticut University Library U-56P (1907)

Waterbury

Post College Traurig Library (1977)
Silas Bronson Public Library (1869)

West Haven

University of New Haven Peterson Library (1971)

DELAWARE

Dover

Delaware State College William C. Jason Library (1962)
State Law Library in Kent County (unknown)

Georgetown

Delaware Technical and Community College Library (1968)
Sussex County Law Library (1976)

Newark

University of Delaware Library (1907)

Wilmington

Delaware Law School Library (1976)
New Castle County Law Library (1974)

DISTRICT OF COLUMBIA

Washington

Administrative Conference of the United States Library (1977)
Advisory Commission on Intergovernmental Relations Library (1972)
American University Washington College of Law Library (1983)
Antioch School of Law Library (1982)
Catholic University of America Robert J. White Law Library (1979)
Civil Aeronautics Board Library (1974)
Department of the Army Pentagon Library ANRAL (1969)
Department of Commerce Library (1955)
Department of Energy, Energy Library (1963)
Department of Health and Human Services Library (1954)
Department of Housing and Urban Development Library (1969)
Department of the Interior Library Natural Resources Library (1895)
Department of Justice Main Library (1895)
Department of Labor Library (1976)
Department of the Navy Library (1895)
Department of State Library (1895)
Department of State Law Library (1966)
Department of Transportation Main Library (1982)
Department of Transportation, U.S. Coast Guard Law Library (1982)
Department of the Treasury Library (1895)
District of Columbia Court of Appeals Library (1981)
District of Columbia Public Library (1943)
Executive Office of the President, Office of Administration, Library & Information Service Division (1965)
Federal Deposit Insurance Corporation Library (1972)
Federal Election Commission Library (1975)
Federal Energy Regulatory Commission Library (1983)
Federal Labor Relations Authority Law Library (1982)
Federal Mine Safety & Health Review Commission Library (1979)
Federal Reserve System Board of Governors Research Library (1978)
Federal Reserve System Law Library (1976)
General Accounting Office Library (1974)
General Services Administration Library (1975)
Georgetown University Library (1969)
Georgetown University Law Center Fred O. Dennis Law Library (1978)
George Washington University Melvin Gelman Library (1983)
George Washington University National Law Center Jacob Burns Law Library (1978)
Library of Congress Congressional Research Service (1978)
Library of Congress Serial and Government Publications (1977)
Merit Systems Protection Board Library (1979)
National Defense University Library (1895)
U.S. Court of Appeals Judges' Library (1975)
U.S. Office of Personnel Management Library (1963)
U.S. Postal Service Library (1895)
U.S. Senate Library (1979)
U.S. Supreme Court Library (1978)
University of the District of Columbia Library (1970)
Veterans' Administration Central Office Library (1967)

FLORIDA

Boca Raton

Florida Atlantic University S. E. Wimberly Library (1963)

Clearwater

Clearwater Public Library (1972)

Coral Gables

University of Miami Library (1939)

Daytona Beach

Volusia County Library Center (1963)

De Land

Stetson University duPont-Ball Library (1887)

Fort Lauderdale

Broward County Main Library (1967)
Nova University, Center for Study of Law/Law Library (1967)

Fort Pierce

Indian River Community College Library (1975)

Gainesville

University of Florida College of Law Library (1978)
University of Florida Libraries (1907) REGIONAL

Jacksonville

Haydon Burns Public Library (1914)
Jacksonville University Swisher Library (1962)
University of North Florida Thomas G. Carpenter Library (1972)

Lakeland

Lakeland Public Library (1928)

Leesburg

Lake-Sumter Community College Library (1963)

Melbourne

Florida Institute of Technology Library (1963)

Miami

Florida International University Library (1970)
Miami-Dade Public Library (1952)

North Miami

Florida International University North Miami Campus Library (1977)

Opa Locka

Biscayne College Library (1966)

Orlando

University of Central Florida Library (1966)

Palatka

Saint Johns River Community College Library (1963)

Panama City

Bay County Public Library (1983)

Pensacola

University of West Florida John C. Pace Library (1966)

Port Charlotte

Charlotte County Library System (1973)

Saint Petersburg

Saint Petersburg Public Library (1965)
Stetson University College of Law Charles A. Dana Library (1975)

Sarasota

Selby Public Library (1970)

Tallahassee

Florida Agricultural and Mechanical University Coleman Learning Resources Center (1936)
Florida State University College of Law Library (1978)
Florida State University Documents Dept./Strozier Library (1941)
Florida Supreme Court Library (1974)
State Library of Florida (1929)

Tampa

Tampa-Hillsborough County Public Library (1965)
University of South Florida Library (1962)
University of Tampa Merl Kelce Library (1953)

Winter Park

Rollins College Mills Memorial Library (1909)

GEORGIA

Albany

Dougherty County Public Library (1964)

Americus

Georgia Southwestern College James Earl Carter Library (1966)

Athens

University of Georgia Libraries (1907) REGIONAL
University of Georgia School of Law Library (1979)

Atlanta

Atlanta Public Library (1880)
Atlanta University Center Robert W. Woodruff Library (1962)
Emory University School of Law Library (1968)
Emory University Woodruff Library (1928)
Georgia Institute of Technology Price Gilbert Memorial Library (1963)
Georgia State Library (unknown)
Georgia State University William Russell Pullen Library (1970)
Georgia State University College of Law Library (1983)
U.S. Court of Appeals 11th Circuit Library (1980)

Augusta

Augusta College Reese Library (1962)

Brunswick

Brunswick-Glynn County Regional Library (1965)

Carrollton

West Georgia College Irvine Sullivan Ingram Library (1962)

Columbus

Columbus College Simon Schwob Memorial Library (1975)

Dahlonega

North Georgia College Stewart Library (1939)

Dalton

Dalton Junior College Library Resource Center (1978)

Decatur

DeKalb Community College South Campus Learning Resources Center (1973)

Macon

Mercer University Stetson Memorial Library (1964)
Mercer University Walter F. George School of Law Library (1978)

Marietta

Kennesaw College Memorial Library (1968)

Milledgeville

Georgia College at Milledgeville Ina Dillard Russell Library (1950)

Mount Berry

Berry College Memorial Library (1970)

Savannah

Chatham-Effingham Liberty Regional Library (1857)

Statesboro

Georgia Southern College Liberty (1939)

Valdosta

Valdosta State College Library (1956)

GUAM

Agana

Nieves M. Flores Memorial Library (1962)

Mangilao

University of Guam Robert F. Kennedy Memorial Library (1978)

HAWAII

Hilo

University of Hawaii at Hilo Library (1962)

Honolulu

Hawaii Medical Library Incorporated (1968)
Hawaii State Library (1929)
Municipal Reference & Records Center (1965)
Supreme Court Law Library (1973)
University of Hawaii Hamilton Library (1907) REGIONAL
University of Hawaii William S. Richardson School of Law Library (1978)

Laie

Brigham Young University Hawaii Campus, Joseph F. Smith Library (1964)

Lihue

Kauai Regional Library (1967)

Pearl City

Leeward Community College Library (1967)

Wailuku

Maui County Library (1962)

IDAHO

Boise

Boise Public Library and Information Center (1929)
Boise State University Library (1966)
Idaho State Law Library (unknown)
Idaho State Library (1971)

Caldwell

College of Idaho Terteling Library (1930)

Moscow

University of Idaho College of Law Library (1978)
University of Idaho Library (1907) REGIONAL

Pocatello

Idaho State University Eli Oboler Library (1908)

Rexburg

Ricks College David O. McKay Library (1946)

Twin Falls

College of Southern Idaho Library (1970)

ILLINOIS

Bloomington

Illinois Wesleyan University Sheean Library (1964)

Carbondale

Southern Illinois University at Carbondale Morris Library (1932)
Southern Illinois University School of Law Library (1978)

Carlinville

Blackburn College Lumpkin Library (1954)

Carterville

Shawnee Library System (1971)

Champaign

University of Illinois Law Library (1965)

Charleston

Eastern Illinois University Booth Library (1962)

Chicago

Chicago Public Library (1876)
Chicago State University Paul and Emily Douglas Library (1954)
DePaul University Law Library (1979)
Field Museum of Natural History Library (1963)
Illinois Institute of Technology Chicago-Kent College of Law Library (1978)
Illinois Institute of Technology Kemper Library (1982)
John Marshall Law School Library (1981)
Loyola University of Chicago E. M. Cudahy Memorial Library (1966)
Loyola University School of Law Library (1979)
Northeastern Illinois University Library (1961)
Northwestern University School of Law Library (1978)
University of Chicago Law Library (1964)
University of Chicago Library (1897)
University of Illinois at Chicago Library (1957)
William J. Campbell Library of the U.S. Courts (1979)

Decatur

Decatur Public Library (1954)

De Kalb

Northern Illinois University Founders' Memorial Library (1960)
Northern Illinois University College of Law Library (1978)

Des Plaines

Oakton Community College Library (1976)

Edwardsville

Southern Illinois University Lovejoy Memorial Library (1959)

Elsah

Principia College Marshall Brooks Library (1957)

Evanston

Northwestern University Library (1876)

Freeport

Freeport Public Library (1905)

Galesburg

Galesburg Public Library (1896)

Jacksonville

MacMurray College Henry Pfeiffer Library (1929)

Kankakee

Olivet Nazarene College Benner Library and Learning Resource Center (1946)

Lake Forest

Lake Forest College Donnelley Library (1962)

Lebanon

McKendree College Holman Library (1968)

Lisle

Illinois Benedictine College Theodore F. Lownik Library (1911)

Macomb

Western Illinois University Government Publications & Legal Reference Library (1962)

Moline

Black Hawk College Learning Resources Center (1970)

Monmouth

Monmouth College Hewes Library (1860)

Mount Carmel

Wabash Valley College Bauer Media Center (1975)

Mount Prospect

Mount Prospect Public Library (1977)

Normal

Illinois State University Milner Library (1877)

Oak Park

Oak Park Public Library (1963)

Oglesby

Illinois Valley Community College Jacobs Memorial Library (1976)

Palos Hills

Moraine Valley Community College Library (1972)

Park Forest South

Governors' State University Library (1974)

Peoria

Bradley University Cullom-Davis Library (1963)
Peoria Public Library (1883)

River Forest

Rosary College Library Rebecca Crown Library (1966)

Rockford

Rockford Public Library (1895)

Romeoville

Lewis University Library (1952)

Springfield

Illinois State Library (unknown) REGIONAL

Streamwood

Poplar Creek Public Library (1980)

Urbana

University of Illinois Documents Library (1907)

Wheaton

Wheaton College Buswell Memorial Library (1964)

Woodstock

Woodstock Public Library (1963)

INDIANA

Anderson

Anderson College Charles E. Wilson Library (1959)
Anderson Public Library (1983)

Bloomington

Indiana University Library (1881)
Indiana University Law Library (1978)

Crawfordsville

Wabash College Lilly Library (1906)

Evansville

Evansville and Vanderburgh County Public Library (1928)
Indiana State University at Evansville Evansville Campus Library (1969)

Fort Wayne

Allen County Public Library (1896)
Indiana University-Purdue University at Fort Wayne Helmke Library (1965)

Franklin

Franklin College Library (1976)

Gary

Gary Public Library (1943)
Indiana University Northwest Campus Library (1966)

Greencastle

De Pauw University Roy O. West Library (1879)

Hammond

Hammond Public Library (1964)

Hanover

Hanover College, Duggan Library (1892)

Huntington

Huntington College Loew Alumni Library (1964)

Indianapolis

Butler University Irwin Library (1965)
Indianapolis-Marion County Public Library (1906)
Indiana State Library (unknown) REGIONAL
Indiana Supreme Court Law Library (1975)
Indiana University School of Law Library (1967)
Indiana University-Purdue University Library (1979)

Kokomo

Indiana University at Kokomo Learning Resource Center (1969)

Muncie

Ball State University Library (1959)
Muncie Public Library (1906)

New Albany

Indiana University Southeastern Campus Library (1965)

Notre Dame

University of Notre Dame Memorial Library (1883)

Rensselaer

Saint Joseph's College Library (1964)

Richmond

Earlham College Lilly Library (1964)
Morrison-Reeves Library (1906)

South Bend

Indiana University at South Bend Library (1965)

Terre Haute

Indiana State University Cunningham Memorial Library (1906)

Valparaiso

Valparaiso University Moellering Memorial Library (1930)
Valparaiso University Law Library (1978)

West Lafayette

Purdue University Libraries (1907)

IOWA

Ames

Iowa State University Library (1907)

Cedar Falls

University of Northern Iowa Library (1946)

Council Bluffs

Free Public Library (1885)
Iowa Western Community College Herbert Hoover Library (1972)

Davenport

Davenport Public Library (1973)

Des Moines

Drake University Cowles Library (1966)
Drake University Law Library (1972)
Public Library of Des Moines (1888)
State Library of Iowa (unknown)

Dubuque

Carnegie-Stout Public Library (unknown)
Loras College Wahlert Memorial Library (1967)

Fayette

Upper Iowa University Henderson-Wilder Library (1974)

Grinnell

Grinnel College Burling Library (1874)

Iowa City

University of Iowa College of Law Law Library (1968)
University of Iowa Libraries (1884) REGIONAL

Lamoni

Graceland College Frederick Madison Smith Library (1927)

Mason City

North Iowa Area Community College Library (1976)

Mount Vernon

Cornell College Russell D. Cole Library (1896)

Orange City

Northwestern College Ramaker Library (1970)

Sioux City

Sioux City Public Library (1894)

KANSAS

Atchison

Benedictine College Library (1965)

Baldwin City

Baker University Collins Library (1908)

Colby

Colby Community College H.F. Davis Memorial Library (1968)

Emporia

Emporia State University William Allen White Library (1909)

Hays

Fort Hays State University Forsyth Library (1926)

Hutchinson

Hutchinson Public Library (1963)

Fort Scott

Fort Scott Community College Learning Resources Center Library (1979)

Lawrence

University of Kansas Law Library (1971)
University of Kansas Spencer Research Library (1869) REGIONAL

Manhattan

Kansas State University Farrell Library (1907)

Pittsburg

Pittsburg State University Leonard H. Axe Library (1952)

Salina

Kansas Wesleyan University Memorial Library (1930)

Shawnee Mission

Johnson County Library (1979)

Topeka

Kansas State Historical Society Library (1877)
Kansas State Library (unknown)
Kansas Supreme Court Law Library (1975)
Washburn University of Topeka Law Library (1971)

Wichita

Wichita State University Ablah Library (1901)

KENTUCKY

Ashland

Boyd County Public Library (1946)

Barbourville

Union College Abigail E. Weeks Memorial Library (1958)

Bowling Green

Western Kentucky University Helm-Cravens Library (1934)

Crestview Hills

Thomas More College Library (1970)

Danville

Centre College Grace Doherty Library (1884)

Frankfort

Kentucky Department of Libraries and Archives (1967)
Kentucky State Law Library (unknown)
Kentucky State University Blazer Library (1972)

Highland Heights

Northern Kentucky University W. Frank Steely Library (1973)

Hopkinsville

Hopkinsville Community College Library (1976)

Lexington

University of Kentucky Law Library (1968)
University of Kentucky Libraries (1907) REGIONAL

Louisville

Louisville Free Public Library (1904)
University of Louisville Ekstrom Library (1925)
University of Louisville Law Library (1975)

Morehead

Morehead State University Camden-Carroll Library (1955)

Murray

Murray State University Waterfield Library (1924)

Owensboro

Kentucky-Wesleyan College Library Learning Center (1966)

Richmond

Eastern Kentucky University John Grant Crabbe Library (1966)

Williamsburg

Cumberland College Norma Perkins Hagan Memorial Library (1983)

LOUISIANA

Baton Rouge

Louisiana State Library (1976)
Louisiana State University Middleton Library (1907) REGIONAL
Louisiana State University Paul M. Hebert Law Center Library (1929)
Southern University Law School Library (1979)
Southern University Library (1952)

Eunice

Louisiana State University at Eunice LeDoux Library (1969)

Hammond

Southeastern Louisiana University Sims Memorial Library (1966)

Lafayette

University of Southwestern Louisiana Library (1938)

Lake Charles

McNeese State University Lether E. Frazar Memorial Library (1941)

Monroe

Northeast Louisiana University Sandel Library (1963)

Natchitoches

Northwestern State University Watson Memorial Library (1887)

New Orleans

Law Library of Louisiana (unknown)
Loyola University Library (1942)

Loyola University Law Library (1978)
New Orleans Public Library (1883)
Our Lady of Holy Cross College Library (1982)
Southern University in New Orleans Leonard S. Washington
Memorial Library (1962)
Tulane University Law Library (1976)
Tuland University Howard-Tilton Memorial Library (1884)
U.S. Court of Appeals Fifth Circuit Library (1973)
University of New Orleans Earl K. Long Library (1963)

Pineville

Louisiana College Richard W. Norton Memorial Library (1969)

Ruston

Louisiana Technical University Prescott Memorial Library (1896)
REGIONAL

Shreveport

Louisiana State University at Shreveport Library (1967)
Shreve Memorial Library (1923)

Thibodaux

Nicholls State University Ellender Memorial Library (1962)

MAINE

Augusta

Maine Law and Legislative Reference Library (1973)
Maine State Library (unknown)

Bangor

Bangor Public Library (1884)

Brunswick

Bowdoin College Library (1884)

Castine

Maine Maritime Academy Nutting Memorial Library (1969)

Lewiston

Bates College George and Helen Ladd Library (1883)

Orono

University of Maine Raymond H. Fogler Library (1907) REGIONAL

Portland

Portland Public Library (1884)
University of Maine School of Law Garbrecht Law Library (1964)

Presque Isle

University of Maine at Presque Isle Library/Learning Resources
Center (1979)

Waterville

Colby College Miller Library (1884)

MARYLAND

Annapolis

Maryland State Law Library (unknown)
U.S. Naval Academy Nimitz Library (1895)

Baltimore

Enoch Pratt Free Library (1887)
Johns Hopkins University Milton S. Eisenhower Library (1882)
Morgan State University Soper Library (1940)
University of Baltimore Langsdale Library (1973)
University of Baltimore Law Library (1980)
University of Maryland School of Law Marshall Law Library (1969)
U.S. Court of Appeals 4th Circuit Library (1982)

Bel Air

Harford Community College Library (1967)

Beltsville

Department of Agriculture National Agricultural Library (1895)

Bethesda

Department of Health and Human Services National Library of
Medicine (1978)
Uniformed Services University of Health Sciences, Learning
Resource Center (1983)

Catonsville

University of Maryland Baltimore County Albin O. Kuhn Library &
Gallery (1971)

Chestertown

Washington College Clifton M. Miller Library (1891)

College Park

University of Maryland McKeldin Library (1925) REGIONAL

Cumberland

Allegany Community College Library (1974)

Frostburg

Frostburg State College Library (1967)

Patuxent River

Patuxent River Central Library (1968)

Rockville

Montgomery County Department of Public Libraries (1951)

Salisbury

Salisbury State College Blackwell Library (1965)

Towson

Goucher College Julia Rogers Library (1966)

Towson State University Cook Library (1979)

Westminster

Western Maryland College Hoover Library (1886)

MASSACHUSETTS

Amherst

Amherst College Library (1884)

University of Massachusetts University Library (1907)

Boston

Boston Athenaeum Library (unknown)

Boston Public Library (1859) REGIONAL

Boston University School of Law Pappas Law Library (1979)

Northeastern University Dodge Library (1962)

State Library of Massachusetts (unknown)

Suffolk University Law Library (1979)

Supreme Judicial Court Social Law Library (1979)

U.S. Court of Appeals First Circuit Library (1978)

Brookline

Public Library of Brookline (1925)

Cambridge

Harvard College Library (1860)

Harvard Law School Library (1981)

Massachusetts Institute of Technology Libraries (1946)

Chicopee

College of Our Lady of the Elms, Alumnae Library (1969)

Lowell

University of Lowell Alumni-Lydon Library (1952)

Lynn

Lynn Public Library (1953)

Medford

Tufts University Library (1899)

Milton

Curry College, Levin Library (1972)

New Bedford

New Bedford Free Public Library (1858)

Newton

Boston College Thomas P. O'Neill Jr. Library (1963)

Newton Centre

Boston College Law School Library (1979)

North Dartmouth

Southeastern Massachusetts University Library (1965)

North Easton

Stonehill College Cushing-Martin Library (1962)

Springfield

Springfield City Library (1966)

Western New England College Law Library (1978)

Waltham

Brandeis University Library (1965)

Waltham Public Library (1982)

Wellesley

Wellesley College Library (1943)

Wenham

Gordon College Winn Library (1963)

Williamstown

William College Library (unknown)

Worcester

American Antiquarian Society Library (1814)

University of Massachusetts Medical Center Lamar Soutter Library (1972)

Worcester Public Library (1859)

MICHIGAN

Albion

Albion College Stockwell Memorial Library (1966)

Allendale

Grand Valley State College Zumberge Library (1963)

Alma

Alma College Library (1963)

Ann Arbor

University of Michigan Harlan Hatcher Graduate Library (1884)

University of Michigan Law Library (1978)

Benton Harbor

Benton Harbor Public Library (1907)

Bloomfield Hills

Cranbrook Institute of Science Library (1940)

Dearborn

Henry Ford Centennial Library (1969)

Henry Ford Community College Library (1957)

Detroit

Detroit College of Law Library (1979)

Detroit Public Library (1868) REGIONAL

Marygrove College Library (1965)

Mercy College of Detroit Library (1965)

University of Detroit Library (1884)

University of Detroit School of Law Library (1978)

Wayne State University G. Flint Purdy Library (1937)

Wayne State University Arthur Neef Law Library (1971)

Dowagiac

Southwestern Michigan College Matthews Library (1971)

East Lansing

Michigan State University Documents Library (1907)

Farmington Hills

Oakland Community College Martin L. King Learning Resources Center (1968)

Flint

Flint Public Library (1967)

University of Michigan-Flint Library (1959)

Grand Rapids

Calvin College & Seminary Library (1967)

Grand Rapids Public Library (1876)

Houghton

Michigan Technological University Library (1876)

Jackson

Jackson District Library (1965)

Kalamazoo

Kalamazoo Public Library (1907)

Western Michigan University Dwight B. Waldo Library (1963)

Lansing

Library of Michigan (unknown) REGIONAL

Thomas M. Cooley Law School Library (1978)

Livonia

Schoolcraft College Library (1962)

Madison Heights

Madison Heights Public Library (1982)

Marquette

Northern Michigan University Olson Library (1963)

Monroe

Monroe County Library System (1974)

Mount Clemens

Macomb County Library (1968)

Mount Pleasant

Central Michigan University Library (1958)

Muskegon

Hackley Public Library (1894)

Olivet

Olivet College Library (1974)

Petoskey

North Central Michigan College Library (1962)

Port Huron

Saint Clair County Library (1876)

Rochester

Oakland University Kresge Library (1964)

Royal Oak

Royal Oak Public Library (1984)

Saginaw

Hoyt Public Library (1890)

Sault Ste. Marie

Lake Superior State College Kenneth Shouldice Library (1982)

Traverse City

Northwestern Michigan College Mark Osterlin Library (1964)

University Center

Delta College Learning Resources Center (1963)

Warren

Warren Public Library Arthur J. Miller Branch (1973)

Wayne

Wayne Oakland Library Federation (1957)

Ypsilanti

Eastern Michigan University Library (1965)

MICRONESIA

Community College of Micronesia Library (1982)

MINNESOTA

Bemidji

Bemidji State University A. C. Clark Library (1963)

Blaine

Anoka County Library (1971)

Collegeville

Saint John's University Alcuin Library (1954)

Cottage Grove

Washington County Library-Park Grove (1983)

Duluth

Duluth Public Library (1909)
University of Minnesota Library and Learning Resources Service
(1984)

Eagan

Dakota County Eagan Library (1983)

Edina

Southdale-Hennepin Area Library (1971)

Mankato

Mankato State University Library (1962)

Minneapolis

Minneapolis Public Library (1893)
University of Minnesota Law School Library (1978)
University of Minnesota Wilson Library (1907) REGIONAL

Moorhead

Moorhead State University Livingston Lord Library (1956)

Morris

University of Minnesota, Morris, Rodney A. Briggs Library (1963)

Northfield

Carleton College Library (1930)
Saint Olaf College Rolvaag Memorial Library (1930)

Saint Cloud

Saint Cloud State University, Learning Resources Center (1962)

Saint Paul

Hamline University School of Law Library (1978)
Minnesota Historical Society Library (1867)
Minnesota State Law Library (unknown)
Saint Paul Public Library (1914)
University of Minnesota Saint Paul Campus Library (1974)
William Mitchell College of Law Library (1979)

Saint Peter

Gustavus Adolphus College Library (1941)

Willmar

Pioneerland Library (1958)

Winona

Winona State University Maxwell Library (1969)

MISSISSIPPI

Cleveland

Delta State University W. B. Roberts Library (1975)

Columbus

Mississippi University for Women John Clayton Fant Memorial Library
(1929)

Hattiesburg

University of Southern Mississippi Joseph A. Cook Memorial Library
(1935)

Jackson

Jackson State University Henry Thomas Sampson Library (1968)
Millsaps College Millsaps-Wilson Library (1963)
Mississippi College School of Law Library (1977)
Mississippi Library Commission (1947)
Mississippi State Law Library (unknown)

Lorman

Alcorn State University Library (1970)

Mississippi State

Mississippi State University Mitchell Memorial Library (1907)

University

University of Mississippi J. D. Williams Library (1883) REGIONAL
University of Mississippi James O. Eastland Law Library (1967)

MISSOURI

Cape Girardeau

Southeast Missouri State University Kent Library (1916)

Columbia

University of Missouri at Columbia Library (1862)
University of Missouri-Columbia Law Library (1978)

Fayette

Central Methodist College George M. Smiley Library (1962)

Fulton

Westminster College Reeves Library (1875)

Jefferson City

Lincoln University Inman E. Page Library (1944)
Missouri State Library (1963)
Missouri Supreme Court Library (unknown)

Joplin

Missouri Southern State College Library (1966)

Kansas City

Kansas City Public Library (1881)
Rockhurst College Greenlease Library (1917)
University of Missouri at Kansas City General Library (1938)
University of Missouri-Kansas City Leon E. Bloch Law Library (1978)

Kirkville

Northeast Missouri State University Pickler Memorial Library (1966)

Liberty

William Jewell College Charles F. Curry Library (1900)

Maryville

Northwest Missouri State University B. D. Owens Library (1982)

Rolla

University of Missouri-Rolla Curtis Laws Wilson Library (1907)

Saint Charles

Lindenwood College Margaret Leggat Butler Library (1973)

Saint Joseph

Saint Joseph Public Library (1891)

Saint Louis

Maryville College Library (1976)
Saint Louis County Library (1970)

Saint Louis Public Library (1866)
Saint Louis University Law Library (1967)
Saint Louis University Pius XII Memorial Library (1866)
U.S. Court of Appeals Eighth Circuit Library (1972)
University of Missouri at Saint Louis Thomas Jefferson Library (1966)
Washington University John M. Olin Library (1960)
Washington University Law Library (1978)

Springfield

Drury College, Walker Library (1874)
Southwest Missouri State University Library (1963)

Warrensburg

Central Missouri State University Ward Edwards Library (1914)

MONTANA

Billings

Eastern Montana College Library (1958)

Bozeman

Montana State University Renne Library (1907)

Butte

Montana College of Mineral Science and Technology Library (1901)

Havre

Northern Montana College Library (1980)

Helena

Carroll College Library (1974)
Montana Historical Society Library (unknown)
Montana State Library (1966)
State Law Library of Montana (1977)

Missoula

University of Montana Maurene & Mike Mansfield Library (1909)
REGIONAL

NEBRASKA

Blair

Dana College Dana-LIFE Library (1924)

Crete

Doane College Perkins Library (1944)

Fremont

Midland Lutheran College Luther Library (1924)

Kearney

Kearney State College Calvin T. Ryan Library (1962)

Lincoln

Nebraska Library Commission (1972) REGIONAL
Nebraska State Library (unknown)
University of Nebraska-Lincoln College of Law Library (1981)
University of Nebraska-Lincoln D. L. Love Memorial Library (1907)

Omaha

Creighton University Reinert/Alumni Library (1964)
Creighton University Law Library (1979)
Omaha Public Library W. Dale Clark Library (1880)
University of Nebraska at Omaha University Library (1939)

Scottsbluff

Scottsbluff Public Library (1925)

Wayne

Wayne State College U.S. Conn Library (1970)

NEVADA

Carson City

Nevada State Library (unknown)
Nevada Supreme Court Library (1973)

Las Vegas

Clark County Library District (1974)
University of Nevada at Las Vegas James Dickinson Library (1959)

Reno

National Judicial College Law Library (1979)
Nevada Historical Society Library (1974)
University of Nevada-Reno Library (1907) REGIONAL
Washoe County Library (1980)

NEW HAMPSHIRE

Concord

Franklin Pierce Law Center Library (1973)
New Hampshire State Library (unknown)

Durham

University of New Hampshire Library (1907)

Hanover

Dartmouth College Library (1884)

Henniker

New England College Danforth Library (1966)

Manchester

Manchester City Library (1884)
New Hampshire College H. A. B. Shapiro Memorial Library (1976)
Saint Anselm's College Geisel Library (1963)

Nashua

Nashua Public Library (1971)

NEW JERSEY

Bayonne

Bayonne Public Library (1909)

Bloomfield

Bloomfield Public Library (1965)

Bridgeton

Cumberland County Library (1966)

Camden

Rutgers University Camden Library (1966)
Rutgers University School of Law Library (1979)

Convent Station

College of Saint Elizabeth Mahoney Library (1938)

East Brunswick

East Brunswick Public Library (1977)

East Orange

East Orange Public Library (1966)

Elizabeth

Elizabeth Free Public Library (1895)

Glassboro

Glassboro State College Savitz Learning Resource Center (1963)

Hackensack

Johnson Public Library (1966)

Irvington

Irvington Public Library (1966)

Jersey City

Jersey City Public Library (1879)
Jersey City State College Forrest A. Irwin Library (1963)

Lawrenceville

Rider College, Franklin F. Moore Library (1975)

Madison

Drew University Library (1939)

Mahwah

Ramapo College Library (1971)

Mount Holly

Burlington County Library (1966)

New Brunswick

New Brunswick Free Public Library (1908)
Rutgers University Alexander Library (1907)

Newark

Newark Public Library (1906) REGIONAL
Rutgers-The State University of New Jersey John Cotton Dana Library (1966)
Rutgers University Law School Library (1979)
Seton Hall University Law Library (1979)

Passaic

Passaic Public Library (1964)

Pemberton

Burlington County College Library (1979)

Phillipsburg

Phillipsburg Free Public Library (1976)

Plainfield

Plainfield Public Library (1971)

Pomona

Stockton State College Library (1972)

Princeton

Princeton University Library (1884)

Randolph

County College of Morris Sherman H. Masten Learning Resource Center (1975)

Rutherford

Fairleigh Dickinson University Messler Library (1953)

Shrewsbury

Monmouth County Library (1968)

South Orange

Seton Hall University McLaughlin Library (1947)

Teaneck

Fairleigh Dickinson University Teaneck/Hackensack Campus Weiner Library (1963)

Toms River

Ocean County College Learning Resources Center (1966)

Trenton

New Jersey State Library (unknown)
Trenton Free Public Library (1902)

Union

Kean College of New Jersey Nancy Thompson Library (1973)

Upper Montclair

Montclair State College Harry A. Sprague Library (1967)

Wayne

Wayne Public Library (1972)

West Long Branch

Monmouth College Guggenheim Memorial Library (1963)

Woodbridge

Woodbridge Public Library (1965)

NEW MEXICO

Albuquerque

University of New Mexico Medical Center Library (1973)
University of New Mexico School of Law Library (1973)
University of New Mexico General Library (1896) REGIONAL

Hobbs

New Mexico Junior College Pannell Library (1969)

Las Cruces

New Mexico State University Library (1907)

Las Vegas

New Mexico Highlands University Donnelly Library (1913)

Portales

Eastern New Mexico University Golden Library (1962)

Santa Fe

New Mexico State Library (1960) REGIONAL
New Mexico Supreme Court Law Library (unknown)

Silver City

Western New Mexico University Miller Library (1972)

Socorro

New Mexico Institute of Mining & Technology Martin Speare
Memorial Library (1984)

NEW YORK

Albany

Albany Law School Library (1979)
New York State Library (unknown) REGIONAL
State University of New York at Albany University Library (1964)

Auburn

Seymour Library (1972)

Bayside

CUNY Law School at Queens College CUNY Law Library (1983)
Queensborough Community College Library (1972)

Binghamton

State University of New York at Binghamton Glenn G. Bartle Library
(1962)

Brockport

State University of New York at Brockport Drake Memorial Library
(1967)

Bronx

Fordham University Library (1937)
Herbert H. Lehman College Library (1967)
New York Public Library (1973)
State University of New York Maritime College Stephen B. Luce
Library (1947)

Bronxville

Sarah Lawrence College Library (1969)

Brooklyn

Brooklyn College Library (1936)
Brooklyn Law School Library (1974)
Brooklyn Public Library (1908)
Polytechnic Institute of New York Spicer Library (1963)
Pratt Institute Library (1891)
State University of New York Downstate Medical Center Library
(1958)

Buffalo

Buffalo and Erie County Public Library (1895)
State University of New York at Buffalo Charles B. Sears Law
Library (1978)
State University of New York at Buffalo Lockwood Memorial Library
(1963)

Canton

Saint Lawrence University Owen D. Young Library (1920)

Cheektowaga

Cheektowaga Public Library Reinstein Memorial Branch (1978)

Corning

Corning Community College Arthur A. Houghton Jr. Library (1963)

Cortland

State University of New York College at Cortland Memorial Library
(1964)

Delhi

State University Agricultural and Technical College Library (1970)

Douglaston

Cathedral College Library (1971)

East Islip

East Islip Public Library (1973)

Elmira

Elmira College Gannett Tripp Learning Center (1956)

Farmingdale

State University of New York at Farmingdale Library (1917)

Flushing

Queens College Paul Klapper Library (1939)

Garden City

Adelphi University Swirbul Library (1966)

Geneseo

State University of New York at Geneseo Milne Library (1967)

Greenvale

Long Island University B. Davis Schwartz Memorial Library (1964)

Hamilton

Colgate University, Everett Needham Case Library (1902)

Hempstead

Hofstra University Library (1964)
Hofstra University School of Law Library (1979)

Ithaca

Cornell University Library (1907)
Cornell Law Library (1978)
New York State College of Agriculture and Human Ecology Albert R.
Mann Library (1943)

Jamaica

Queens Borough Public Library (1926)
Saint John's University Library (1956)
Saint John's University School of Law Library (1978)

Kings Point

U.S. Merchant Marine Academy Schuyler Otis Bland Library (1962)

Long Island City

Fiorello H. LaGuardia Community College Library (1981)

Mount Vernon

Mount Vernon Public Library (1962)

New Paltz

State University College at New Paltz Sojourner Truth Library (1965)

New York City

Cordoza Law School Library (1979)
City University of New York City College Library (1884)
College of Insurance Library (1965)
Columbia University Libraries (1882)
Columbia University School of Law Library (1981)
Copper Union for the Advancement of Science and Arts Library (1930)
Medical Library Center of New York (1976)
New York Law Institute Library (1909)
New York Law School Library (1979)
New York Public Library (1907)
New York Public Library (1884)
New York University Law Library (1974)
New York University, Elmer Holmes Bobst Library (1967)
U.S. Court of Appeals Second Circuit Library (1976)
Yeshive University Pollack Library (1979)

Newburgh

Newburgh Free Library (1909)

Niagara Falls

Niagara Falls Public Library (1976)

Oakdale

Dowling College Library (1965)

Oneonta

State University College at Oneonta James M. Milne Library (1966)

Oswego

State University College at Oswego Penfield Library (1966)

Plattsburgh

State University College at Plattsburgh Benjamin F. Feinberg Library (1967)

Potsdam

Clarkson College of Technology Harriet Call Burnap Memorial Library (1938)
State University College at Potsdam Frederick W. Crumb Memorial Library (1964)

Poughkeepsie

Vassar College Library (1943)

Purchase

State University of New York, College of Purchase Library (1969)

Rochester

Rochester Public Library (1963)
University of Rochester Rush Rhees Library (1880)

Saint Bonaventure

Saint Bonaventure University Friedsam Memorial Library (1938)

Saratoga Springs

Skidmore College Library (1964)

Schenectady

Union College Schaffer Library (1901)

Southampton

Southampton College Library (1973)

Staten Island

Wagner College Horrmann Library (1953)

Stony Brook

State University of New York at Stony Brook Main Library (1963)

Syracuse

Onondaga County Public Library (1978)
Syracuse University Library (1878)
Syracuse University William C. Ruger Law Library (1978)

Troy

Troy Public Library (1869)

Uniondale

Nassau Library System (1965)

Utica

Utica Public Library (1885)
SUNY College of Technology Library (1977)

West Point

U.S. Military Academy Cadet Library (unknown)

White Plains

Pace University Law School Library (1978)

Yonkers

Yonkers Public Library Getty Square Branch (1910)

Yorktown Heights

Mercy College Library (1976)

NORTH CAROLINA

Asheville

University of North Carolina at Asheville D. Hiden Ramsey Library (1965)

Boiling Springs

Gardner-Webb College Dover Memorial Library (1974)

Boone

Appalachian State University Library (1963)

Buies Creek

Campbell University Carrie Rich Memorial Library (1965)

Chapel Hill

University of North Carolina at Chapel Hill Wilson Library (1884)
REGIONAL
University of North Carolina Law Library (1978)

Charlotte

Public Library of Charlotte and Mecklenburg County (1964)
Queens College Everett Library (1927)
University of North Carolina at Charlotte Atkins Library (1964)

Cullowhee

Western Carolina University Hunter Library (1953)

Davidson

Davidson College Library (1893)

Durham

Duke University School of Law Library (1978)
Duke University William R. Perkins Library (1890)
North Carolina Central University Law Library (1979)
North Carolina Central University James E. Shepard Memorial Library (1973)

Elon College

Elon College Iris Holt McEwen Library (1971)

Fayetteville

Fayetteville State University Charles W. Chesnutt Library (1971)

Greensboro

North Carolina Agricultural and Technical State University F. D. Bluford Library (1937)
University of North Carolina at Greensboro Walter Clinton Jackson Library (1963)

Greenville

East Carolina University, J. Y. Joyner Library (1951)

Laurinburg

Saint Andrews Presbyterian College DeTamble Library (1969)

Lexington

Davidson County Public Library (1971)

Mount Olive

Mount Olive College Moyer Library (1971)

Murfreesboro

Chowan College Whitaker Library (1963)

Pembroke

Pembroke State University Mary H. Livermore Library (1956)

Raleigh

Department of Cultural Resources Division of State Library (unknown)
North Carolina State University D. H. Hill Library (1923)
North Carolina Supreme Court Library (1972)
Wake County Public Library (1969)

Rocky Mount

North Carolina Wesleyan College Library (1969)

Salisbury

Catawba College Library (1925)

Wilmington

University of North Carolina at Wilmington William M. Randall Library (1965)

Wilson

Atlantic Christian College Hackney Library (1930)

Winston-Salem

Forsyth County Public Library (1954)
Wake Forest University Z. Smith Reynolds Library (1902)

NORTH DAKOTA

Bismarck

North Dakota State Library (1971)
North Dakota Supreme Court Law Library (unknown)
State Historical Society of North Dakota State Archives & Historical
Research Library (1907)
Veteran's Memorial Public Library (1967)

Dickinson

Dickinson State College Stoxen Library (1968)

Fargo

Fargo Public Library (1964)
North Dakota State University Library (1907) REGIONAL

Grand Forks

University of North Dakota Chester Fritz Library (1890)

Minot

Minot State College Memorial Library (1925)

Valley City

Valley City State College Library (1913)

OHIO

Ada

Ohio Northern University J. P. Taggart Law Library (1965)

Akron

Akron-Summit County Public Library (1952)
University of Akron Bierce Library (1963)
University of Akron School of Law Library (1978)

Alliance

Mount Union College Library (1888)

Ashland

Ashland College Library (1938)

Athens

Ohio University Alden Library (1886)

Batavia

University of Cincinnati at Batavia Clermont General and Technical
College Library (1973)

Bluffton

Bluffton College, Musselman Library (1951)

Bowling Green

Bowling Green State University Jerome Library (1933)

Canton

Malone College Everett L. Cattell Library (1970)

Chardon

Geauga County Public Library (1971)

Cincinnati

Public Library of Cincinnati and Hamilton County (1884)
University of Cincinnati Central Library (1929)
University of Cincinnati College of Law (1978)

Cleveland

Case Western Reserve University Freiburger Library (1913)
Case Western Reserve University School of Law Library (1979)
Cleveland Public Library (1886)
Cleveland State University Cleveland-Marshall College of Law,
Joseph W. Bartunek III Law Library (1978)
Cleveland State University Library (1966)
Municipal Reference Library (1970)

Cleveland Heights

Cleveland Heights-University Heights Public Library (1970)

Columbus

Capital University Law School Library (1980)
Capital University Library (1968)
Ohio State University Libraries (1907)
Ohio Supreme Court Law Library (1973)
Public Library of Columbus and Franklin County (1885)
State Library of Ohio (unknown) REGIONAL

Dayton

Dayton and Montgomery County Public Library (1909)
University of Dayton Roesch Library (1969)
Wright State University Library (1965)

Delaware

Ohio Wesleyan University L. A. Beeghly Library (1845)

Elyria

Elyria Public Library (1966)

Findlay

Findlay College Shafer Library (1969)

Gambier

Kenyon College Library (1873)

Granville

Denison University Libraries, William H. Doane Library (1884)

Hiram

Hiram College Teachout-Price Memorial Library (1874)

Kent

Kent State University Libraries (1962)

Marietta

Marietta College Dawes Memorial Library (1884)

Marion

Marion Public Library (1979)

Middletown

Miami University-Middletown Gardner-Harvey Library (1970)

New Concord

Muskingum College Library (1966)

Oberlin

Oberlin College Library (1858)

Oxford

Miami University Libraries King Library (1909)

Portsmouth

Portsmouth Public Library (unknown)

Rio Grande

Rio Grande College and Community College Jeanette Albiez Davis Library (1966)

Springfield

Warder Public Library (1884)

Steubenville

University of Steubenville Starvaggi Memorial Library (1971)
Public Library of Steubenville and Jefferson County (1950)

Tiffin

Heidelberg College Beeghly Library (1964)

Toledo

Toledo-Lucas County Public Library (1884)
University of Toledo College of Law Library (1981)
University of Toledo Library (1963)

University Heights

John Carroll University Grasselli Library (1963)

Westerville

Otterbein College Courtright Memorial Library (1967)

Wooster

College of Wooster Andrews Library (1966)

Youngstown

Public Library of Youngstown and Mahoning County (1923)
Youngstown State University William F. Maag Library (1971)

OKLAHOMA

Ada

East Central Oklahoma State University Linscheid Library (1914)

Alva

Northwestern Oklahoma State University J. W. Martin Library (1907)

Bethany

Bethany Nazarene College R. T. Williams Learning Resources Center (1971)

Durant

Southeastern Oklahoma State University Henry G. Bennett Memorial Library (1929)

Edmond

Central State University Library (1934)

Enid

Public Library of Enid and Garfield County (1908)

Langston

Langston University G. Lamar Harrison Library (1941)

Muskogee

Muskogee Public Library (1971)

Norman

University of Oklahoma Libraries Bizzell Memorial Library (1893)
University of Oklahoma Law Library (1978)

Oklahoma City

Metropolitan Library System Main Library (1974)
Oklahoma City University Library (1963)
Oklahoma Department of Libraries (1893) REGIONAL

Shawnee

Oklahoma Baptist University Library (1933)

Stillwater

Oklahoma State University Library (1907) REGIONAL

Tahlequah

Northeastern Oklahoma State University John Vaughan Library (1923)

Tulsa

Tulsa City-County Library System (1963)
University of Tulsa College of Law Library (1979)
University of Tulsa McFarlin Library (1929)

Weatherford

Southwestern Oklahoma State University Al Harris Library (1958)

OREGON

Ashland

Southern Oregon State College Library (1953)

Corvallis

Oregon State University Library (1907)

Eugene

University of Oregon Law Library (1979)
University of Oregon Library (1883)

Forest Grove

Pacific University Harvey W. Scott Memorial Library (1897)

Klamath Falls

Oregon Institute of Technology Library (1982)

La Grande

Eastern Oregon College Walter M. Pierce Library (1954)

McMinnville

Linfield College Northup Library (1965)

Monmouth

Western Oregon State College Library (1967)

Pendleton

Blue Mountain Community College Library (1983)

Portland

Lewis and Clark College Aubrey R. Watzek Library (1967)
Library Association of Portland (1884)
Northwestern School of Law Lewis and Clark College Paul L. Boley Law Library (1979)
Portland State University Library (1963) REGIONAL
Reed College Library (1912)
U.S. Department of Energy Bonneville Power Administration Library (1962)

Salem

Oregon State Library (unknown)
Oregon Supreme Court Law Library (1974)
Willamette University College of Law Library (1979)
Willamette University Main Library (1969)

PENNSYLVANIA

Allentown

Muhlenberg College Haas Library (1939)

Altoona

Altoona Area Public Library (1969)

Bethel Park

Bethel Park Public Library (1980)

Bethlehem

Lehigh University Libraries Liderman Library (1876)

Blue Bell

Montgomery County Community College Learning Resources Center (1975)

Bradford

University of Pittsburgh at Bradford Bradford Campus Library (1979)

Carlisle

Dickinson College Boyd Lee Spahr Library (1947)
Dickinson School of Law Sheeley-Lee Law Library (1978)

Cheyney

Cheyney University Leslie Pinckney Hill Library (1967)

Collegeville

Ursinus College Myrin Library (1963)

Coraopolis

Robert Morris College Library (1978)

Doylestown

Bucks County Free Library (1970)

East Stroudsburg

East Stroudsburg University Kemp Library (1966)

Erie

Erie County Library System (1897)

Greenville

Theil College Langenheim Memorial Library (1963)

Harrisburg

State Library of Pennsylvania (unknown) REGIONAL

Haverford

Haverford College Magill Library (1897)

Hazleton

Hazleton Area Public Library (1964)

Indiana

Indiana University of Pennsylvania Rhodes R. Stabley Library (1962)

Johnstown

Cambria County Library System Glosser Memorial Library Building (1965)

Lancaster

Franklin and Marshall College Shadek-Fackenthal Library (1895)

Lewisburg

Bucknell University Ellen Clarke Bertrand Library (1963)

Mansfield

Mansfield University Library (1968)

Meadville

Allegheny College Lawrence Lee Pelletier Library (1907)

Millersville

Millersville University Helen A. Ganser Library (1966)

Monessen

Monessen Public Library (1969)

New Castle

New Castle Public Library (1963)

Newtown

Bucks County Community College Library (1968)

Norristown

Montgomery County-Norristown Public Library (1969)

Philadelphia

Drexel University Library (1963)

Free Library of Philadelphia (1897)

Saint Joseph's University Drexel Library (1974)

Temple University Paley Library (1947)

Temple University Law Library (1979)

Thomas Jefferson University Scott Memorial Library (1978)

U.S. Court of Appeals Third Circuit Library (1973)

University of Pennsylvania Biddle Law Library (1974)

University of Pennsylvania Library (1886)

Pittsburgh

Allegheny County Law Library (1977)

Carnegie Library of Pittsburgh (1895)

Carnegie Library of Pittsburgh Allegheny Regional Branch (1924)

Duquesne University Law Library (1978)

La Roche College John J. Wright Library (1974)

U.S. Department of Interior Bureau of Mines Library (1962)

University of Pittsburgh Hillman Library (1910)

University of Pittsburgh Law Library (1979)

Pottsville

Pottsville Free Public Library (1967)

Reading

Reading Public Library (1901)

Scranton

Scranton Public Library (1895)

Shippensburg

Shippensburg University Ezra Lehman Memorial Library (1973)

Slippery Rock

Slippery Rock University Bailey Library (1965)

Swarthmore

Swarthmore College Library (1923)

University Park

Pennsylvania State University Libraries Pattee Library (1907)

Villanova

Villanova University Law School Pulling Law Library (1964)

Warren

Warren Library Association Warren Public Library (1885)

Washington

Washington and Jefferson College U. Grant Miller Library (1884)

Waynesburg

Waynesburg College Library (1964)

West Chester

West Chester University Francis Harvey Green Library (1967)

Wilkes-Barre

King's College D. Leonard Corgan Library (1949)

Williamsport

Lycoming College Library (1970)

York

York College of Pennsylvania Schmidt Library (1963)

Youngwood

Westmoreland County Community College Learning Resources Center (1972)

PUERTO RICO

Mayaguez

University of Puerto Rico Mayaguez Campus Library (1928)

Ponce

Catholic University of Puerto Rico Encarnacion Valdes Library (1966)
Catholic University of Puerto Rico School of Law Library (1978)

Rio Piedras

University of Puerto Rico General Library (1928)

RHODE ISLAND

Kingston

University of Rhode Island Library (1907)

Newport

U.S. Naval War College Library (1963)

Providence

Brown University John D. Rockefeller Jr. Library (unknown)
Providence College Phillips Memorial Library (1969)
Providence Public Library (1884)
Rhode Island College James P. Adams Library (1965)
Rhode Island State Law Library (1979)
Rhode Island State Library (1895)

Warwick

Warwick Public Library (1966)

Westerly

Westerly Public Library (1909)

Woonsocket

Woonsocket Harris Public Library (1977)

SOUTH CAROLINA

Charleston

Baptist College at Charleston L. Mendel Rivers Library (1967)
The Citadel Daniel Library (1962)
College of Charleston Robert Scott Small Library (1869)

Clemson

Clemson University Cooper Library (1893)

Columbia

Benedict College Payton Learning Resources Center (1969)
South Carolina State Library (1895)
University of South Carolina Coleman Karesh Law Library (1983)
University of South Carolina Thomas Cooper Library (1884)

Conway

University of South Carolina Coastal Carolina College Kimbel Library (1974)

Due West

Erskine College McCain Library (1968)

Florence

Florence County Library (1967)
Francis Marion College James A. Rogers Library (1970)

Greenville

Furman University Library (1962)
Greenville County Library (1966)

Greenwood

Lander College Larry A. Jackson Library (1967)

Orangeburg

South Carolina State College Miller F. Whittaker Library (1953)

Rock Hill

Winthrop College Dacus Library (1896)

Spartansburg

Spartansburg County Public Library (1967)

SOUTH DAKOTA

Aberdeen

Northern State College Beulah Williams Library (1963)

Brookings

South Dakota State University H. M. Briggs Library (1889)

Pierre

South Dakota State Library (1973)
South Dakota Supreme Court Library (1978)

Rapid City

Rapid City Public Library (1963)
South Dakota School of Mines and Technology Devereaux Library (1963)

Sioux Falls

Augustana College Mikkelsen Library (1969)
Sioux Falls Public Library (1903)

Spearfish

Black Hills State College Library Learning Center (1942)

Vermillion

University of South Dakota I.D. Weeks Library (1889)

Yankton

Yankton College James Lloyd Library (1904)

TENNESSEE

Bristol

King College E. W. King Library (1970)

Chattanooga

Chattanooga-Hamilton County Bicentennial Library (1908)
U.S. Tennessee Valley Authority Technical Library (1976)

Clarksville

Austin Peay State University Felix G. Woodward Library (1945)

Cleveland

Cleveland State Community College Library (1973)

Columbia

Columbia State Community College John W. Finney Memorial Library (1973)

Cookeville

Tennessee Technological University Jere Whitson Memorial Library (1969)

Jackson

Lambuth College Luther L. Gobbel Library (1967)

Jefferson City

Carson-Newman College Library (1964)

Johnson City

East Tennessee State University Sherrod Library (1942)

Knoxville

Public Libraries Knoxville-Knox County, Lawson McGhee Library (1973)
University of Tennessee at Knoxville James D. Hoskins Library (1907)
University of Tennessee Law Library (1971)

Martin

University of Tennessee at Martin Paul Meek Library (1957)

Memphis

Mamphis-Shelby County Public Library and Information Center (1896)
Memphis State University Cecil C. Humphreys School of Law Library (1979)
Memphis State University Libraries (1966)

Murfreesboro

Middle Tennessee State University Todd Library (1912)

Nashville

Fisk University Library (1965)
Public Library of Nashville and Davidson County (1884)
Tennessee State Law Library (1976)
Tennessee State Library and Archives (unknown)
Tennessee State University Brown-Daniel Library (1972)
Vanderbilt University Law Library (1976)
Vanderbilt University Library (1884)

Sewanee

University of the South Jessie Ball duPont Library (1873)

TEXAS

Abilene

Abilene Christian University Margaret and Herman Brown Library (1978)

Hardin-Simmons University Rupert and Pauline Richardson Library (1940)

Arlington

Arlington Public Library (1970)

University of Texas at Arlington Library (1963)

Austin

Texas State Law Library (1972)

Texas State Library (unknown) REGIONAL

University of Texas at Austin Perry-Castañeda Library (1884)

University of Texas at Austin Edie and Lew Wasserman Public Affairs Library (1966)

University of Texas at Austin Tarlton Law Library (1965)

Baytown

Lee College Library (1970)

Beaumont

Lamar University Mary and John Gray Library (1957)

Brownwood

Howard Payne University Walker Memorial Library (1964)

Canyon

West Texas State University Cornette Library (1928)

College Station

Texas Agricultural and Mechanical University Library (1907)

Commerce

East Texas State University Library (1937)

Corpus Christi

Corpus Christi State University Library (1976)

Corsicana

Navarro College Gaston T. Gooch Library (1965)

Dallas

Bishop College Zale Library (1966)

Dallas Baptist College Vance Memorial Library (1967)

Dallas Public Library (1900)

Southern Methodist University Fondren Library (1925)

University of Texas Health Science Center-Dallas Library (1975)

Denton

North Texas State University Library (1948)

Edinburg

Pan American University Library (1959)

El Paso

El Paso Public Library (1906)

University of Texas at El Paso Documents & Maps Library (1966)

Fort Worth

Fort Worth Public Library (1905)

Texas Christian University Mary Couts Burnett Library (1916)

Galveston

Rosenberg Library (1909)

Houston

Houston Public Library (1884)

North Harris County College Learning Resource Center (1974)

Rice University Fondren Library (1967)

South Texas College of Law Library (1981)

Texas Southern University Thurgood Marshall School of Law Library (1982)

University of Houston-Clear Lake Alfred R. Neumann Library (1980)

University of Houston Library (1957)

University of Houston School of Law Library (1979)

Huntsville

Sam Houston State University Library (1949)

Irving

Irving Public Library System (1974)

Kingsville

Texas Arts and Industries University Jernigan Library (1944)

Laredo

Laredo Junior College Harold R. Yearly Library (1970)

Longview

Nicholson Memorial Public Library (1961)

Lubbock

Texas Tech University Library (1935) REGIONAL

Texas Tech University School of Law Library (1978)

Marshall

Wiley College Thomas Winston Cole Sr. Library (1962)

Nacogdoches

Stephen F. Austin State University Steen Library (1965)

Plainview

Wayland Baptist University Van Howeling Memorial Library (1963)

Richardson

University of Texas at Dallas Library (1972)

San Angelo

Angelo State University Porter Henderson Library (1964)

San Antonio

Saint Mary's University Academic Library (1964)

Saint Mary's University Law Library (1982)

San Antonio College Library (1972)

San Antonio Public Library (1899)

Trinity University Library (1964)

University of Texas at San Antonio Library (1973)

San Marcos

Southwest Texas State University Library (1955)

Seguin

Texas Lutheran College Blumberg Memorial Library (1970)

Sherman

Austin College Arthur Hopkins Library (1963)

Texarkana

Texarkana Community College Palmer Memorial Library (1963)

Victoria

Victoria College/University of Houston Victoria Campus Library (1973)

Waco

Baylor University Law Library (1982)

Baylor University Moody Memorial Library (1905)

Wichita Falls

Midwestern State University Moffett Library (1963)

UTAH

Cedar City

Southern Utah State College Library (1964)

Ephraim

Snow College Lucy A. Phillips Library (1963)

Logan

Utah State University Merrill Library and Learning Resources Center (1907) REGIONAL

Ogden

Weber State College Stewart Library (1962)

Provo

Brigham Young University Harold B. Lee Library (1908)

Brigham Young University Law Library (1972)

Salt Lake City

University of Utah Eccles Health Sciences Library (1970)

University of Utah Law Library (1966)

University of Utah Marriott Library (1893)

Utah State Library (unknown)

Utah State Supreme Court Law Library (1975)

VERMONT

Burlington

University of Vermont Bailey/Howe Library (1907)

Castleton

Castleton State College Calvin Coolidge Library (1969)

Johnson

Johnson State College John Dewey Library (1955)

Lyndonville

Lyndon State College Samuel Reed Hall Library (1969)

Middlebury

Middlebury College Egbert Starr Library (1884)

Montpelier

Vermont Department of Libraries (1895)

Northfield

Norwich University Library (1908)

South Royalton

Vermont Law School Library (1978)

VIRGIN ISLANDS

Saint Croix

Florence Williams Public Library (1974)

Saint Thomas

College of the Virgin Islands Ralph M. Paiewonsky Library (1973)
Enid M. Baa Library and Archives (1968)

VIRGINIA

Alexandria

Dept. of the Navy Office of Judge Advocate General Law Library (1963)

Arlington

George Mason University School of Law Library (1981)

Blacksburg

Virginia Polytechnic Institute and State University Carol M. Newman Library (1907)

Bridgewater

Bridgewater College Alexander Mack Memorial Library (1902)

Charlottesville

University of Virginia Alderman Library (1910) REGIONAL
University of Virginia Arthur J. Morris Law Library (1964)

Chesapeake

Chesapeake Public Library (1970)

Danville

Danville Community College Learning Resources Center (1969)

Emory

Emory and Henry College Kelly Library (1884)

Fairfax

George Mason University Fenwick Library (1960)

Fredericksburg

Mary Washington College E. Lee Trinkle Library (1940)

Hampden-Sydney

Hampden-Sydney College Eggleston Library (1891)

Hampton

Hampton Institute Huntington Memorial Library (1977)

Harrisonburg

James Madison University Carrier Library (1973)

Hollins College

Hollins College Fishburn Library (1967)

Lexington

Virginia Military Institute Preston Library (1874)
Washington and Lee University University Library (1910)
Washington and Lee University Wilbur C. Hall Law Library (1978)

Martinsville

Patrick Henry Community College Library (1971)

Norfolk

Norfolk Public Library (1895)
Old Dominion University Library (1963)
U.S. Armed Forces Staff College Library (1963)

Petersburg

Virginia State University Johnston Memorial Library (1907)

Quantico

Federal Bureau of Investigation Academy Library (1970)
Marine Corps Development and Education Command James
Carson Breckinridge Library (1967)

Reston

Department of the Interior Geological Survey Library (1962)

Richmond

U.S. Court of Appeals Fourth Circuit Library (1973)
University of Richmond Boatwright Memorial Library (1900)
University of Richmond Law School Library (1982)
Virginia Commonwealth University James Branch Cabell Library
(1971)
Virginia State Law Library (1973)
Virginia State Library (unknown)

Salem

Roanoke College Library (1886)

Williamsburg

College of William and Mary Marshall-Wythe Law Library (1978)
College of William and Mary Swem Library (1936)

Wise

Clinch Valley College John Cook Wyllie Library (1971)

WASHINGTON

Bellingham

Western Washington University Mable Zoe Wilson Library (1963)

Cheney

Eastern Washington University JFK Library (1966)

Ellensburg

Central Washington University Library (1962)

Everett

Everett Public Library (1914)

Midway

Highline Community College Library (1983)

Olympia

Evergreen State College Daniel J. Evans Library (1972)

Washington State Law Library (1979)

Washington State Library (unknown) REGIONAL

Port Angeles

North Olympic Library System (1965)

Pullman

Washington State University Library (1907)

Seattle

Seattle Public Library (1908)

University of Washington Libraries (1890)

University of Washington Marian Gould Gallagher Law Library (1969)

U.S. Court of Appeals 9th Circuit Library (1981)

Spokane

Gonzaga University School of Law Library (1979)

Spokane Public Library (1910)

Tacoma

Tacoma Public Library (1894)

University of Puget Sound Collins Memorial Library (1938)

University of Puget Sound School of Law Library (1978)

Vancouver

Fort Vancouver Regional Library (1962)

Walla Walla

Whitman College Penrose Memorial Library (1890)

WEST VIRGINIA

Athens

Concord College Library (1924)

Bluefield

Bluefield State College Hardway Library (1972)

Charleston

Kanawha County Public Library (1952)

West Virginia Library Commission (unknown)

West Virginia Supreme Court Law Library (1977)

Elkins

Davis and Elkins College Library (1913)

Fairmont

Fairmont State College Library (1884)

Glenville

Glenville State College Robert F. Kidd Library (1966)

Huntington

Marshall University James E. Morrow Library (1925)

Institute

West Virginia State College Drain-Jordon Library (1907)

Morgantown

West Virginia University Library (1907) REGIONAL

Salem

Salem College Library (1921)

Shepherdstown

Shepherd College Ruth Scarborough Library (1971)

Weirton

Mary H. Weir Public Library (1963)

WISCONSIN

Appleton

Lawrence University Seeley G. Mudd Library (1869)

Beloit

Beloit College Col. Robert H. Morse Library (1888)

Eau Claire

University of Wisconsin-Eau Claire William D. McIntyre Library (1951)

Fond du Lac

Fond du Lac Public Library (1966)

Green Bay

University of Wisconsin-Green Bay Learning Resources Center (1968)

La Crosse

La Crosse Public Library (1883)

University of Wisconsin-La Crosse Murphy Library (1965)

Madison

Madison Public Library (1965)

State Historical Society of Wisconsin Library (1870) REGIONAL

University of Wisconsin-Madison Memorial Library (1939)

University of Wisconsin-Madison Law Library (1981)

Wisconsin State Law Library (unknown)

Milwaukee

Alverno College Library/Media Center (1971)

Medical College of Wisconsin, Inc. Todd Wehr Library (1980)

Milwaukee County Law and Reference Library (1934)

Milwaukee Public Library (1861) REGIONAL

Saint Mary College Haggerty Library (1964)

University of Wisconsin-Milwaukee Library (1960)

Oshkosh

University of Wisconsin-Oshkosh Forrest R. Polk Library (1956)

Platteville

University of Wisconsin-Platteville Karrmann Library (1964)

Racine

Racine Public Library (1898)

Ripon

Ripon College Library (1982)

River Falls

University of Wisconsin-River Falls Chalmer Davee Library (1962)

Sheboygan

Mead Public Library (1983)

Stevens Point

University of Wisconsin-Stevens Point Learning Resources Center (1951)

Superior

Superior Public Library (1908)

University of Wisconsin-Superior Jim Dan Hill Library (1935)

Waukesha

Waukesha Public Library (1966)

Wausau

Marathon County Public Library (1971)

Whitewater

University of Wisconsin-Whitewater Harold Anderson Library (1963)

WYOMING

Casper

Natrona County Public Library (1929)

Cheyenne

Wyoming State Law Library (1977)

Wyoming State Library (unknown) REGIONAL

Gillette

Campbell County Public Library (1980)

Laramie

University of Wyoming, Coe Library (1907)

University of Wyoming Law Library (1978)

Powell

Northwest Community College John Taggart Hinckley Library (1967)

Riverton

Central Wyoming College Library (1969)

Rock Springs

Western Wyoming College Library (1969)

Sheridan

Sheridan College, Griffith Memorial Library (1963)

**APPENDIX B.
DISTRICT
OFFICES
OF THE U.S.
DEPARTMENT
OF
COMMERCE**

NORTHEASTERN REGION I

CONNECTICUT

•**Hartford**—Room 610-B, Federal Office Building, 450 Main Street 06103, Area Code 203 Tel 244-3530, FTS 244-3530

MAINE

•**Augusta (Boston, Massachusetts District)**—1 Memorial Circle, Casco Bank Bldg. 04330, Area Code 207 Tel 622-8249, FTS 833-6249

MASSACHUSETTS

Boston—10th Floor, 441 Stuart Street 02116, Area Code 617 Tel 223-2312, FTS 223-2312

NEW HAMPSHIRE

Serviced by Boston District Office

NEW YORK

Buffalo—1312 Federal Building, 111 West Huron Street 14202, Area Code 716 Tel 846-4191, FTS 437-4191

•**Rochester**—183 E. Main St., Rm. 666, 16404, Area Code 716 Tel 263-6480, FTS 963-6480

New York—Room 3718, Federal Office Building, 26 Federal Plaza, Foley Square 10278, Area Code 212 Tel 264-0634, FTS 264-0600

RHODE ISLAND

•**Providence (Boston, Massachusetts District)**—7 Jackson Walkway 02903, Area Code 401 Tel 277-2605, ext. 22, FTS 838-4482

VERMONT

Serviced by Boston District Office

MID-ATLANTIC REGION II

DELAWARE

Serviced by Philadelphia District Office

DISTRICT OF COLUMBIA

Serviced by Baltimore District Office

MARYLAND

Baltimore—415 U.S. Customhouse, Gay and Lombard Streets 21202, Area Code 301 Tel 962-3560, FTS 922-3560

•**Rockville**—101 Monroe St., 15th Floor, 20850, Area Code 301 Tel 251-2345

NEW JERSEY

•**Trenton**—Capitol Plaza, 8th Fl., 240 West State St., 08608, Area Code 609 Tel 989-2100, FTS 483-2100

PENNSYLVANIA

Philadelphia—9448 Federal Building, 600 Arch Street 19106 Area Code 215 Tel 597-2866, FTS 597-2866

Pittsburgh—2002 Federal Building, 1000 Liberty Avenue 15222, Area Code 412 Tel 644-2850, FTS 722-2850

APPALACHIAN REGION III

KENTUCKY

Louisville—Room 636B, U.S. Post Office and Courthouse Building 40202, Area Code 502 Tel 582-5066, FTS 352-5066

NORTH CAROLINA

•**Greensboro**—203 Federal Building, West Market Street, P.O. Box 1950 27402, Area Code 919 Tel 378-5345, FTS 699-5345

•**Raleigh**—Dobbs Bldg., Rm. 294, 430 N. Salisbury St., 27611, Area Code 919 Tel 755-4687, FTS 672-4687

SOUTH CAROLINA

Columbia—Strom Thurmond Fed. Bldg., Suite 172, 1835 Assembly Street 29201 Area Code 803 Tel 765-5345, FTS 677-5345

•**Charleston**—505 Federal Building, 334 Meeting Street 29403, Area Code 803 Tel 677-4361, FTS 677-4361

•**Greenville**—P.O. Box 5823, Station B, 29606, Area Code 803 Tel 235-5919

TENNESSEE

Nashville—Suite 1427, One Commerce Place, 37239, Area Code 615 Tel 251-5161, FTS 852-5161

•**Memphis**—3693 Central Ave., 38111, Area Code 901 Tel 521-4826, FTS 222-4826

VIRGINIA

Richmond—8010 Federal Bldg., 400 North 8th Street, 23240, Area Code 804 Tel 771-2246, FTS 925-2246

•**(Fairfax County)** Dunn Loring—8100 Oak St. Ste. 32, 22027, Area Code 703 Tel 573-9460, FTS 235-1519

WEST VIRGINIA

Charleston—3000 New Federal Building, 500 Quarrier Street 25301, Area Code 304 Tel 343-6181, ext. 375, FTS 924-1375

SOUTHEASTERN REGION IV

ALABAMA

***Birmingham**—Suite 200-201, 908 South 20th Street, 35205, Area Code 205 Tel 254-1331, FTS 229-1331

FLORIDA

Miami—Suite 224, Federal Building, 51 S.W. First Avenue 33130, Area Code 305 Tel 350-5267, FTS 350-5267

•**Clearwater**—128 North Osceola Avenue 33515, Area Code 813 Tel 461-0011

•**Jacksonville**—3 Independent Drive, 32202, Area Code 904 Tel 791-2796, FTS 946-2796

•**Orlando**—75 East Ivanhoe Blvd. 32802 Area Code 305 Tel 425-1247

•**Tallahassee**—Collins Bldg., Rm. G-20 32304, Area Code 904 Tel 488-6469, FTS 946-4320

GEORGIA

Atlanta—Suite 600, 1365 Peachtree Street, N.E. 30309, Area Code 404 Tel 881-7000, FTS 257-7000

Savannah—27 E. Bay Street, P.O. Box 9746, 31401, Area Code 912 Tel 944-4204, FTS 248-4204

MISSISSIPPI

Jackson—Jackson Mall Office Ctr., Ste. 3230, 300 Woodrow Wilson Blvd., 39213, Area Code 601 Tel 960-4388, FTS 490-4388

PUERTO RICO

San Juan (Hato Rey)—Room 659-Federal Building 00918, Area Code 809 Tel 753-4555, Ext. 555, FTS 8-809-753-4555

GREAT LAKES REGION V

ILLINOIS

Chicago—1406 Mid Continental Plaza Building, 55 East Monroe Street 60603, Area Code 312 Tel 353-4450, FTS 353-4450

•**Palatine**—W. R. Harper College, Algonquin & Roselle Rd., 60067, Area Code 312 Tel 397-3000, x-532

INDIANA

Indianapolis—357 U.S. Courthouse & Federal Office Building, 46 East Ohio Street 46204. Area Code 317 Tel 269-6214, FTS 331-6214

MICHIGAN

Detroit—445 Federal Building, 231 West Lafayette 48226, Area Code 313 Tel 226-3650, FTS 226-3650

•**Grand Rapids**—300 Monroe N.W., Rm. 409 49503 Area Code 616 Tel 456-2411 FTS 372-2411

MINNESOTA

Minneapolis—Dir. 108 Fed. Bldg., 110 S. 4th St., 55401, Area Code 612 Tel 349-3338, FTS 787-3338

OHIO

***Cincinnati**—9504 Federal Office Building, 550 Main Street 45202, Area Code 513 Tel 684-2944, FTS 684-2944

Cleveland—Room 600, 666 Euclid Avenue 44114, Area Code 216 Tel 522-4750, FTS 942-4750

WISCONSIN

Milwaukee—Fed. Bldg., U.S. Courthouse, 517 E. Wisc. Ave., 53202, Area Code 414 Tel 291-3473, FTS 362-3473

PLAINS REGION VI

IOWA

Des Moines—817 Federal Building, 210 Walnut Street 50309, Area Code 515 Tel 284-4222, FTS 862-4222

KANSAS

•**Wichita (Kansas City, Missouri District)**—P.O. Box 48, Wichita State University, 67208, Area Code 316 Tel 269-6160, FTS 752-6160

MISSOURI

***St. Louis**—120 South Central Avenue 63105, Area Code 314 Tel 425-3302-4, FTS 279-3302

Kansas City—Room 1840, 601 East 12th Street 64106, Area Code 816 Tel 374-3142, FTS 758-3142

NEBRASKA

Omaha—Empire State Bldg., 1st Floor, 300 South 19th Street, 68102, Area Code 402 Tel 221-3664, FTS 864-3664

NORTH DAKOTA

Served by Omaha District Office

SOUTH DAKOTA

Served by Omaha District Office

CENTRAL REGION VII

ARKANSAS

Little Rock—Suite 635, Savers Federal Building, 320 W. Capitol Avenue, 72201, Area Code 501 Tel 378-5794, FTS 740-5794

LOUISIANA

New Orleans—432 International Trade Mart, No. 2 Canal Street 70130, Area Code 504 Tel 589-6546, FTS 682-6546

NEW MEXICO

Albuquerque—505 Marquette Ave., NW, Suite 1015, 87102, Area Code 505 Tel 766-2386, FTS 474-2386

OKLAHOMA

Oklahoma City—4024 Lincoln Boulevard 73105, Area Code 405 Tel 231-5302, FTS 736-5302

•**Tulsa**—440 S. Houston Street, 74127, Area Code 918 Tel 581-7650 FTS 736-7650

TEXAS

***Dallas**—Room 7A5, 1100 Commerce Street 75242 Area Code 214 Tel 767-0542, FTS 729-0542

Houston—2625 Federal Courthouse Bldg., 515 Rusk Street 77002, Area Code 713 Tel 229-2578, FTS 526-4578

ROCKY-MOUNTAIN REGION VIII

ARIZONA

Phoenix—Suite 2750 Valley Bank Center, 201 North Central Avenue 85073, Area Code 602 Tel 261-3285, FTS 261-3285

COLORADO

***Denver**—Room 119, U.S. Customhouse, 721-19th Street, 80202, Area Code 303 Tel 837-3246, FTS 327-3246

IDAHO

***Boise**—Statehouse, 83720, Area Code 208 Tel 334-2470

MONTANA

Serviced by Denver District Office

NEVADA

Reno—1755 E. Plumb Lane, #152, 89502, Area Code 702 Tel 784-5203, FTS 470-5203

UTAH

Salt Lake City—U.S. Courthouse, 350 S. Main Street 84101, Area Code 801 Tel 524-5116, FTS 588-5116

WYOMING

Serviced by Denver District Office

PACIFIC REGION IX

ALASKA

Anchorage—701 C Street, P.O. Box 32, 99513, Area Code 907 Tel 271-5041, FTS 8 907 271-5041

CALIFORNIA

Los Angeles—Room 800, 11777 San Vicente Boulevard 90049, Area Code 213 Tel 209-6707, FTS 793-6707

***San Diego**—2nd Floor, Port Administration Bldg., 3165 Pacific Hwy., 92101 Area Code 619 Tel 293-5395, FTS 895-5395

***San Francisco**—Federal Building, Box 36013, 450 Golden Gate Avenue 94102, Area Code 415 Tel 556-5860, FTS 556-5868

***San Jose**—111 West Saint John St., Rm. 424, 95113 Area Code 408 Tel 275-7648

HAWAII

Honolulu—4106 Federal Building, P.O. Box 50026, 300 Ala Moana Boulevard 96850, Area Code 808 Tel 546-8694, FTS 8 808-546-8694

OREGON

Portland—Room 618, 1220 S.W. 3rd Avenue 97204, Area Code 503 Tel 221-3001, FTS 423-3001

WASHINGTON

Seattle—Room 706, Lake Union Building, 1700 Westlake Avenue North 98109, Area Code 206 Tel 442-5616, FTS 399-5615

***Spokane**—P.O. Box 2170, 99210, Area Code 509 Tel 838-8202

*Denotes trade specialist at post of duty station

*Denotes regional office with supervisory regional responsibilities

U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA SHEET (See instructions)		1. PUBLICATION OR REPORT NO. NBS/SP 457-9	2. Performing Organ. Report No.	3. Publication Date August 1985
4. TITLE AND SUBTITLE BUILDING TECHNOLOGY PUBLICATIONS Supplement 9: 1984				
5. AUTHOR(S) Linda Beavers, Editor				
6. PERFORMING ORGANIZATION (If joint or other than NBS, see instructions) NATIONAL BUREAU OF STANDARDS DEPARTMENT OF COMMERCE WASHINGTON, D.C. 20234			7. Contract/Grant No.	8. Type of Report & Period Covered Final
9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS (Street, City, State, ZIP) Same as Item 6.				
10. SUPPLEMENTARY NOTES <input type="checkbox"/> Document describes a computer program; SF-185, FIPS Software Summary, is attached.				
11. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here) This report presents NBS' Center for Building Technology (CBT) publications for 1984. It is the ninth supplement to NBS Special Publication 457, <u>Building Technology Publications</u> , and lists (CBT) reports issued during 1984. It includes titles and abstracts of each CBT publication and those papers published in non-NBS media, key word and author indexes, and general information and instructions on how to order CBT publications. This document is divided into five sections. The first, <u>Reports Announcements</u> is bibliographic data and abstracts for NBS publications and papers published in outside sources. The <u>Personal Author Index</u> cites each CBT author and gives the publication title, NTIS order number, and abstract number for those publications listed in the Reports Announcements section. The <u>Key Words Index</u> lists key words, publication title, NTIS order number, and abstract number for each publication and paper. The <u>NTIS Order/Report Number Index</u> lists the NBS report series number, NTIS order number, title, and abstract number. The <u>Title Index</u> lists the title, NTIS order number, and abstract number.				
12. KEY WORDS (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons) Abstracts; building; building research; building technology; Center for Building Research; key words; publications				
13. AVAILABILITY <input checked="" type="checkbox"/> Unlimited <input type="checkbox"/> For Official Distribution. Do Not Release to NTIS <input checked="" type="checkbox"/> Order From Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. <input type="checkbox"/> Order From National Technical Information Service (NTIS), Springfield, VA. 22161			14. NO. OF PRINTED PAGES 82 15. Price	

ORDER FORM To: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

Enclosed is \$ _____ ☐ check,
☐ money order, or charge to my
Deposit Account No.

_____-____

Order No. _____



Credit Card Orders Only

Total charges \$ _____ Fill in the boxes below.

Credit Card No. _____

Expiration Date
Month/Year _____

Company or personal name

Additional address/attention line

Street address

City

State

ZIP Code

(or Country)

PLEASE PRINT OR TYPE

For Office Use Only

Quantity	Charges
.....	Enclosed
.....	To be mailed
.....	Subscriptions
.....	Postage
.....	Foreign handling
.....	MMOB
.....	OPNR
..... UPNS
..... Discount
..... Refund

NTTS.

ORDER FORM

Telephone: _____

Attention: _____

DTIC User Code _____

Contract Number

(last 6 characters only)

For Government Users

(who report on SF-224)

(8 digit)

--	--	--	--	--	--	--	--

(Enter if different from address at left)

Date _____

Name _____

Organization _____

Address _____

City, State, ZIP _____

☐ Charge my NTIS deposit account no. _____☐ Purchase order no. _____☐ Check enclosed for \$ _____

☐ Ship & Bill. See reverse (not applicable outside North America)

☐ Charge to my ☐ American Express ☐ Visa ☐ Master Card

Account no. _____

Card expiration date _____

Signature _____

(Required to validate order)

It is vital that you order by NTIS order number or your order will be manually filled, causing a delay. You can opt for *airmail/first class delivery* as indicated below. Just check the *Priority Mail Services* box. If you're really pressed for time, call the NTIS Rush Handling Service (703) 487-4700 or (800) 336-4700. For a \$10 per copy charge your order will be mailed within 8 working hours. Or, you can pick up your order in the Washington Information Center & Bookstore or at our Springfield Operations Center within 24 hours for a \$6 per copy charge.

[illegible]

****ALL PRICES SUBJECT TO CHANGE.**

***If ordering by title or if item ordered is a magnetic tape, please see reverse side.

Enter
Grand
Total

9

USER ROUTING CODE:

NTIS can label each item for routing within your organization. If you want this service put your routing code in the box marked USER ROUTING CODE (Limit eight characters).

SHIP & BILL SERVICE:

Prepayment helps to expedite your order and can be accomplished through the use of an NTIS Deposit Account, check, money order, or charge card account number • For "Ship and Bill," NTIS charges \$5 extra for each order (regardless of the number of items; \$5 extra for each NTISearch; • NTIS does not "Ship and Bill" for orders outside North America.

**ORDERING MAGNETIC TAPE:
(check model)**

☐ 7 track ☐ 800 BPI ☐ odd parity ☐ 1600 BPI
☐ 556 BPI ☐ even parity ☐ 9 track (odd parity)
☐ 800 BPI

ORDERING BY TITLE:

If ordering without an NTIS order number (by title only) allow an additional two weeks.

TITLE #1

Sponsor's Series #	Contract or Grant Number of Report	Date Published
Originator (Give specific laboratory, or division and location.)		Personal Author
Turn to other side. Write "1" in the NTIS Order Number block and complete the rest of the line.		

TITLE #2

Sponsor's Series #	Contract or Grant Number of Report	Date Published
Originator (Give specific laboratory, or division and location.)		Personal Author
Turn to other side. Write "2" in the NTIS Order Number block and complete the rest of the line.		

TITLE #3

Sponsor's Series #	Contract or Grant Number of Report	Date Published
Originator (Give specific laboratory, or division and location.)		Personal Author
Turn to other side. Write "3" in the NTIS Order Number block and complete the rest of the line.		

TITLE #4

Sponsor's Series #	Contract or Grant Number of Report	Date Published
Originator (Give specific laboratory, or division and location.)		Personal Author
Turn to other side. Write "4" in the NTIS Order Number block and complete the rest of the line.		

TITLE #5

Sponsor's Series #	Contract or Grant Number of Report	Date Published
Originator (Give specific laboratory, or division and location.)		Personal Author
Turn to other side. Write "5" in the NTIS Order Number block and complete the rest of the line.		

NBS *Technical Publications*

Periodical

Journal of Research—The Journal of Research of the National Bureau of Standards reports NBS research and development in those disciplines of the physical and engineering sciences in which the Bureau is active. These include physics, chemistry, engineering, mathematics, and computer sciences. Papers cover a broad range of subjects, with major emphasis on measurement methodology and the basic technology underlying standardization. Also included from time to time are survey articles on topics closely related to the Bureau's technical and scientific programs. Issued six times a year.

Nonperiodicals

Monographs—Major contributions to the technical literature on various subjects related to the Bureau's scientific and technical activities.

Handbooks—Recommended codes of engineering and industrial practice (including safety codes) developed in cooperation with interested industries, professional organizations, and regulatory bodies.

Special Publications—Include proceedings of conferences sponsored by NBS, NBS annual reports, and other special publications appropriate to this grouping such as wall charts, pocket cards, and bibliographies.

Applied Mathematics Series—Mathematical tables, manuals, and studies of special interest to physicists, engineers, chemists, biologists, mathematicians, computer programmers, and others engaged in scientific and technical work.

National Standard Reference Data Series—Provides quantitative data on the physical and chemical properties of materials, compiled from the world's literature and critically evaluated. Developed under a worldwide program coordinated by NBS under the authority of the National Standard Data Act (Public Law 90-396).

NOTE: The Journal of Physical and Chemical Reference Data (JPCRD) is published quarterly for NBS by the American Chemical Society (ACS) and the American Institute of Physics (AIP). Subscriptions, reprints, and supplements are available from ACS, 1155 Sixteenth St., NW, Washington, DC 20056.

Building Science Series—Disseminates technical information developed at the Bureau on building materials, components, systems, and whole structures. The series presents research results, test methods, and performance criteria related to the structural and environmental functions and the durability and safety characteristics of building elements and systems.

Technical Notes—Studies or reports which are complete in themselves but restrictive in their treatment of a subject. Analogous to monographs but not so comprehensive in scope or definitive in treatment of the subject area. Often serve as a vehicle for final reports of work performed at NBS under the sponsorship of other government agencies.

Voluntary Product Standards—Developed under procedures published by the Department of Commerce in Part 10, Title 15, of the Code of Federal Regulations. The standards establish nationally recognized requirements for products, and provide all concerned interests with a basis for common understanding of the characteristics of the products. NBS administers this program as a supplement to the activities of the private sector standardizing organizations.

Consumer Information Series—Practical information, based on NBS research and experience, covering areas of interest to the consumer. Easily understandable language and illustrations provide useful background knowledge for shopping in today's technological marketplace.

Order the above NBS publications from: Superintendent of Documents, Government Printing Office, Washington, DC 20402.

Order the following NBS publications—FIPS and NBSIR's—from the National Technical Information Service, Springfield, VA 22161.

Federal Information Processing Standards Publications (FIPS PUB)—Publications in this series collectively constitute the Federal Information Processing Standards Register. The Register serves as the official source of information in the Federal Government regarding standards issued by NBS pursuant to the Federal Property and Administrative Services Act of 1949 as amended, Public Law 89-306 (79 Stat. 1127), and as implemented by Executive Order 11717 (38 FR 12315, dated May 11, 1973) and Part 6 of Title 15 CFR (Code of Federal Regulations).

NBS Interagency Reports (NBSIR)—A special series of interim or final reports on work performed by NBS for outside sponsors (both government and non-government). In general, initial distribution is handled by the sponsor; public distribution is by the National Technical Information Service, Springfield, VA 22161, in paper copy or microfiche form.

U.S. Department of Commerce
National Bureau of Standards
Gaithersburg, MD 20899

Official Business

Penalty for Private Use \$300

BULK RATE
POSTAGE & FEES PAID
NBS
PERMIT No. G195