Search Guide for the NTIS Database

Introduction

Organization of the Search Guide

Section I - Introduction: Provides a basic introduction to the features of the NTIS Database, how it differs from other government and/or scientific and technical databases and how it supplements other government databases.

Section II - NTIS Database Elements: Each component field of the bibliographic record is defined with examples. Presents the record structure and composition of the NTIS Database. Changes in the use of a field are discussed. NTIS' names and labels for the fields in the bibliographic citation are identified.

Section III – Online Searching Hints: Includes online searching hints arranged alphabetically by topic and field. Points covered are: searching accession numbers and specially assigned information product type numbers; abbreviations, acronyms; biological species; chemical studies; and verbalization of scientific and mathematical symbols. Distinctions between sponsoring agencies and performing agencies in the corporate author field are shown.

The NTIS subject category codes are interpreted with emphasis on health care and medicine, environment, and business-related information. Geographic features and locations are demonstrated as well as discussions of developing country, foreign language documents and translations. Searching for reprints, maps, patents, and environmental impact statements are also covered. The placement and meaning of sponsoring agency acronym codes are also noted.

Section IV – Selected References for Assistance in Searching the NTIS Database: Contains a list of references to the authority files used by NTIS and its cooperating agencies at the Department of Energy, NASA and the Defense Technical Information Center.

Section V – Gov.Research_Center (GRC): Presents contact information and gives the basic features of GRC; includes a fields guide chart and sample record.

Appendix A – NTIS Subject Categories: Alphabetical Listing by Major Categories

Appendix B – NTIS Subject Categories: Alphabetical Listing of All Categories

Appendix C – NTIS Subject Categories: Alphabetical Listing with Scope Descriptions

Appendix D – NTIS Subject Categories: Numerical Listing of Major Categories

Appendix E – NTIS Subject Categories: Numerical Listing with Scope Descriptions

Purpose of the Search Guide

This guide provides the information necessary for productive and cost-effective search and retrieval.
Use this manual to:

- Minimize "false hits," which are common to such large and varied databases;
- Clarify the NTIS Database information derived from multiple government sources;
- Gain an in-depth understanding of the database structure;
- Provide background references and historical perspective; and
- Serve as a reference manual for users, or a teaching tool at training seminars.

Audience

This publication targets:

- New online searchers;
- Users who are familiar with online search techniques but not familiar with the NTIS Database;
- Librarians or instructors who train users of library services; and
- Researchers using online systems.

The NTIS Database and Related Products

Section I

Introduction

The NTIS Database contains summaries of scientific, technical, engineering, and business information products acquired by NTIS from 1964 to the present. Printed or microform indexes provide access to the titles that predate the online database. The NTIS Database is updated on a weekly basis by NTIS.

The NTIS Database combines unclassified input from the Department of Defense, Department of Energy, and NASA, with that of numerous other government agencies, among which are the Environmental Protection Agency, National Institute of Standards and Technology, and Department of the Interior, to offer users a wide range of information resources. The full reports are available from NTIS for almost 90 percent of the titles announced on the database. Delivery service and ordering options are described at the end of this Search Guide.

Leasing the NTIS Database

Organizations that need to search the NTIS Database frequently may wish to consider leasing the NTIS Database directly from NTIS. Requirements and pricing information may be obtained by contacting the Office of Product Management (703) 605-6515.

Document Delivery via NTIS

In order to satisfy NTIS Database document requests by customers, NTIS offers a competitively priced ordering service. Delivery is available for almost 90 percent of the reports found in the NTIS Database. After searching and identifying documents from the Database, customers can contact NTIS to order the corresponding full-text reports. Take advantage of this valuable service by calling 1-800-553-6847 or (703)-605-6000, or fax orders to (703) 605-6900. Customers can e-mail their document requests to: orders@ntis.gov, or access the NTIS World Wide Web site at http://www.ntis.gov/ for product ordering instructions. Link to NTIS Price Schedules from the Customer Support Web Page http://www.ntis.gov/pdf/pricode.pdf.

NTIS Online Searching Help Desk

The Help Desk will answer your questions on searching the database and its subject content from 8:30 a.m. to 5 p.m., Eastern time. Call (703) 605-6585.

Scope of the Collection

Viewed by any measure, the NTIS information collection is extremely varied in its makeup. The NTIS Database contains information about environmental sciences, computer sciences, telecommunications, health care, physical sciences, international trade, energy, transportation, regulations, research administration, business, education and more.

On average, NTIS has added over 60,000 new titles per year to the NTIS Database over the past ten years. These reports become a permanent part of the NTIS collection. As the U.S. Government's central technical and scientific information service, NTIS announces summaries of the research and studies sponsored by more than 600 Federal agencies as well as from state and local governments.

Subject Coverage

Because the U.S. Government funds more than half of the research and engineering activities in the United States, the NTIS Database contains information on most scientific and technical subjects. The next chart shows this coverage for FY 2005. The subject categories, which NTIS uses in coding its database entries, are explained in detail in the appendices.

Approximate Distribution By Subject Headings In NTIS Database - Fiscal Year 2008

subject heading	percent
Administration & Management	10.75
Aeronautics & Aerodynamics	4.00
Agriculture & Food	3.50
Astronomy & Astrophysics	1.25
Atmospheric Sciences	2.00
Behavior & Society	18.60
Biomedical Technology & Human Factors Engineering	2.50
Building Industry Technology	1.50
Business & Economics	9.00
Chemistry	7.30
Civil Engineering	2.90
Combustion, Engines, & Propellants	2.50
Communication	3.50
Computers, Control, & Information Theory	6.50
Detection & Countermeasures	2.70
Electrotechnology	3.75
Energy	6.00
Environmental Pollution & Control	10.00
Government Inventions for Licensing	8.50
Health Care	6.50
Industrial & Mechanical Engineering	2.90
Library & Information Sciences	2.60
Manufacturing Technology	2.00
Materials Science	4.00
Mathematical Sciences	3.50
Medicine & Biology	22.00
Military Sciences	15.00
Missile Technology	0.30
Natural Resources & Earth Sciences	8.50
Navigation, Guidance, & Control	0.75
Nuclear Science & Technology	3.50
Ocean Technology & Engineering	4.00
Ordnance	2.00
Photography & Recording Devices	0.40
Physics	11.50
Problem Solving Information for State & Local Governments	9.00
Space Technology	2.90
Transportation	2.90
Urban & Regional Technology & Development	10.60

Note: Citations may have been coded with more than one category.
The citations have been counted for each category used, on average 3-5 categories..

Information Sources

The titles in the NTIS collection are submitted by hundreds of government agencies, numerous state and local governments, federal contractors, academic institutions, foreign governments, international organizations and private sector organizations.

Since the American Technology Preeminence Act (Public Law 102-245) passed in 1991, NTIS' wealth of information has increased dramatically. The ATPA requires all federal agencies to submit their federally-funded scientific, technical and engineering information to NTIS within 15 days of the date the product is made publicly available. Consequently, NTIS can provide its customers with timely access to a more diverse and comprehensive range of information.

International Sources

NTIS is the lead U.S. Government agency for cooperation in international technical information exchange. Overseas organizations that currently contribute to the NTIS collection include the National Aerospace Laboratory in Japan, Micromedia in Canada, and many more.

Top Ten Foreign Contributors Fiscal Year 2008

country of origin	number of citations
1. United Kingdom	152
2. Netherlands	149
3. Italy	81
4. Canada	77
5. Norway	56
6. Finland	33
7. Japan	32
8. Sweden	25
9. China	24
10. Taiwan	22

Information Product Types

The NTIS information collection contains a wide variety of types of publications, as well as other media for distributing information. The following table provides a snapshot of some of the types of information products received by NTIS in 2008.

Types of Information Products

U.S. Government Produced	*Number*
Technical reports	25,266
Conference proceedings	548
Journal articles	1,071
Theses	1,176
Bibliographies	12
Computer Products	64
Audiovisuals	6
Foreign Acquisitions	
Technical reports	387
Conference proceedings	1
Theses	11
Bibliographies	0

Data Elements of the NTIS Database

Section II

In the 1960's, under the aegis of the Committee on Scientific and Technical Information (COSATI), Federal Council on Science and Technology, the managers of scientific and technical information (STI) programs in the federal government adopted standard guidelines for cataloging technical reports. Four of these agencies, NTIS, the Department of Energy's Office of Scientific and Technical Information, the National Aeronautics and Space Administration's Scientific and Technical Information Program, and the Defense Technical Information Center, exchange bibliographic tapes and cooperate on information services-related projects. These agencies, along with the Department of Health and Human Services, sponsor more than 90 percent of federally funded research and development.

The fields of the NTIS Database are presented below in the order that they appear on the electronic media sent to online database vendors, and other organizations that lease the database from NTIS for internal use. Each vendor has a unique load of the NTIS Database and the placement of the fields may vary.

Field Name: NTIS Order No.

Examples:

Citations indexed and abstracted by NTIS
PB2000-123456

Citations provided by NASA
N2000-12345/6

Citations provided by the Department of Defense
AD-A123 456/7, AD-D123 456, AD-M

Citations provided by the Department of Energy
DE2000123456

Citations provided by Fach-informations-zentrum (FIZ)
TIB/A2000-12345

Citations provided by Micromedia Ltd. (Canada)
MIC-2000-123451

Definition: Each title has a unique NTIS order number (accession number/identification number) assigned in this field. This number should be used when ordering the title from NTIS.

All NTIS order numbers have alphabetic prefixes. Some alphabetic prefixes indicate the originating agency of the report collections, as shown in the above examples. The alphabetic prefix is followed by a five- to eight-digit number and three alphabetic characters. When searching, it is a good practice to truncate after the first six digits to find an accession number; however, when placing an order, the entire alphanumeric number order must be used.

Note: *Not all of the government agencies that have individual accession number alphabetic prefixes are shown in the examples. The examples are limited to agencies with the largest volume of records in the database.*

Field Name: Subject Category Codes

Examples: 70A, 48D

Definition: NTIS and its predecessor organization have used two subject classification schemes:

1) the Committee on Scientific and Technical Information (COSATI); and

2) the NTIS Subject Category Classification.

Any one document may have up to five subject categories assigned to it, although some documents may have more. If a title covers three or more subcategories of a major subject category, it is assigned to the general section of the major category code. Each citation in the database contains the full number of subject category codes that reflect the subjects covered by 20 percent or more of the report.

The NTIS Subject Category Classification has been used exclusively since July 1986. A list of the subject category codes is included in this guide as Appendix B. It is used to arrange the citations into subject areas.

Field Name: NTIS Prices

Note: *This field is not searchable.*

Example: PC A02/MF A01

Definition: These are alphabetic codes for each medium in which the item is delivered:

Paper Copy (PC), Microfiche (MF), CD-ROM, Audiovisual (AV), magnetic tape (mag tape), and diskette. The numeric part of the code determines the price of an individual item. The current NTIS Price Schedules are accessible from the NTIS Customer Support Web Page at http://www.ntis.gov/pdf/pricode.pdf.

Field Name: Corporate Source(s)

Example: Army Information Systems Command, Chambersburg, Pennsylvania.

Definition: This is the name of the organization(s) and/or author affiliation(s) that performed the research and prepared the report(s). The corporate source is also known as the corporate author and performing organization.

Since 1980, NTIS has maintained an up-to-date machine-readable corporate source authority list with standardized names and a nine-digit organization code number. The nine-digit code appears in the database and is searchable.

Some online services asterisk the performing organization names to distinguish them from the sponsoring organization(s). The names of organizations have been entered in full and in abbreviated forms.

Examples: Massachusetts Inst. of Tech
Mass Inst. of Tech
Massachusetts Inst. of Technology

Field Name: Title

Example: Guide to Evaluating Thermal Effects in Concrete Pavements

Definition: The name of the document that appears on the title page or document cover. A colon is used when separating a subtitle from the main title.

Foreign language reports present the foreign language title first, followed by the English translated title in parenthesis. When English translations are made of foreign language documents, the English title is presented prior to the foreign language title.

Field Name: Journal and Database Issue

This field contains a title's original announcement journal volume and issue in the format "JVVII":

where J = a letter designating the journal
where VV = a two-digit volume number; and
where II = a two-digit issue number.

Example: u9412, GRAI9412, GRA&I9412.

This corresponds to reports that were announced in GRA&I Issue 9412. Following the GRA&I issue number are letter codes that designate other agencies' announcement journals. Some online vendors list the example shown and some translated the "u" into GRAI or GRA&I with the volume and issue. "n" was the designated prefix code for documents which were announced in the *Department of Energy Announcement Journals Nuclear Science Abstracts* from 1964–1976 and *Energy Research Abstracts* from January 1976 – August 1976. After August 1976, the "n" code in this field was discontinued. "s" is used in this field to identify NASA documents announced in the journal, Scientific and Technical Aerospace Reports (STAR). Some vendors use the "s" and some present the name of the STAR journal in this field. Note:

Definition: This field is used to identify the NTIS Announcement Journal volume and issue in GRA&I, and any source agency announcement journal volume and issue in which the citation first appeared.

Field Name: Title Note

Example: Datafile, Audiovisual, Thesis, Software, Final Report, Master's Thesis, Patent, Patent Application, Models-simulation, VHS video, CD-ROM.

Definition: Additional title information that clarifies the document or report type. The field sometimes contains a subtitle.

Field Name: Personal Author(s)

Example: Hyder, M. L., Smith, J. C.

Format: *Full last name comma [space] first initial period [space] middle initial [period].*

Definition: This field lists the personal author(s) name(s).

Format: Names are recorded in the same order and as they appear in the document, with first and middle initials. All titles, degrees, Jr., Sr., II, III and IV are omitted. Prior to 1984, some names appear with the last name followed by the first name and middle name or middle initial.

Note: *There is no authority list for personal author names. Searchers will need to develop search strategies to provide for variations, using truncation, adjacent, etc., to obtain all the reports by one author. Truncation in online searching means to cut a word short at any point in its order, for example, to retrieve all terms with a common root or both singular and plural forms.*

Field Name: Report Date

Example: December 2000
2 June 2000
c19 Mar 2001

Definition: This field contains the date the document was completed. However, on translations and journal articles this date may correspond to some other time, such as the date of the translation, the date of the journal issue, the date of a filing for a patent, or the date of publication in some other journal.

Note: *Beginning in mid-1978, a lower case "c" appears for the citations of copyrighted material, as seen in the third example.*

Field Name: Pagination or Number of Items

Example: 103 p*
1 mag tape
2 diskettes

Definition: This field contains the number of paper or microfiche pages in a document. Blank pages are not counted. The field also notes the number of magnetic tapes, diskettes, VHS tapes, cassettes, etc.

Note: *An asterisk appearing after the page count indicates that the report generated a great deal of interest when it was announced. This is not a searchable field.*

Field Name: Country of Publication

Example: France

Definition: The country in which the document originated or was published.

Note: *Each online vendor provides either the full country name or code in its specific search process. International agencies may supply the country in which they are located. In some cases, this field may be blank because the source agency did not provide the information.*

Field Name: Language of Document

Example: English, French

Definition: The language in which the full document was written.

Note: *If the abstract is in English, but the document is written in another language, then only the language of the full document is identified, and not the language of the abstract.*

Field Name: Report Number

Example: Department of Transportation
TR-93-03-T

Environmental Protection Agency (EPA)
EPA/600/J-94/280

Definition: The number the sponsoring agency assigns to the title. Most report numbers have alpha prefixes followed by numerics. This field may be blank or may contain one or two report numbers assigned by the performing organization(s).

Note: *When the performing and sponsoring organization are the same, the sponsoring organization's report number will appear in this field, but not in the monitor agency number field. If the document doesn't have an agency report number, this field is blank.*

Field Name: Contract or Grant Number(s)

Example: USDA-88-COOP-2-3482
NSF-BBS-8820984
DI-14-35-001-30501

Definition: This field contains the contract or grant number assigned by a federal agency to the research project which resulted in the cited document.

Field Name: Project and Task Numbers

Note: *These have not been used since 1984.*

Example: UCAl-WRC-W-428 ARGUS Calibration

Field Name: Monitoring Agency Number

Example: AFGL-TR-85-0194
EPA/560/7-85/000-1

Definition: This field provides the report number(s) assigned by the sponsoring organization(s) unless the latter is also the performing organization(s). When the sponsoring and performing organization are the same, the monitoring agency numbers are placed in the report number field.

Field Name: Supplementary Notes

Example: See also...
Supersedes...
Other related reports
Pub. in Proceedings of the American Control Conference...
Sponsored by Department of Energy, Washington, D.C.
Sponsored in cooperation with...
Any additional information about the document

Definition: This field presents: the source of a translation; language of a report, if other than English; source of a periodical citation; supplemental performing or sponsoring organizations; additional contracts or grants; and conferences, etc.

Field Name: Availability Statement

Example: Also available as PBYYYY-1234
Also available from Supt. of Docs. as...
Available through FedWorld® by download only
Also available as a set of reports

Definition: A statement of availability that appears when there are special ordering instructions, especially when a report is not available from NTIS or when the report is available from NTIS *and* another organization. Magnetic tapes and diskette products always carry a special descriptive statement in this field concerning their format.

Field Name: Descriptors

Example: Air pollution control
Mechanical properties
*Corrosion prevention

Definition: Descriptors are single or multiword subject terms assigned by NTIS or other contributing agencies. These descriptors use the controlled vocabulary thesauri or word lists which appear in the reference list Appendix A.

Descriptors preceded by an asterisk are those terms determined to be of greatest importance in describing the subject content of a report. Use these asterisked terms to limit an online search. Reports indexed by NTIS are assigned descriptors for the most specific concepts covered in the documents and for applications of the research.

Reports announced by NTIS but indexed by another agency contain that agency's descriptors from its own thesauri. The three major agencies currently providing their own descriptors are: the Department of Defense Technical Information Center (DTIC); Department of Energy (DOE); and the National Aeronautics and Space Administration (NASA).

Field Name: Identifier

Example: Fugitive dust
AIDS (Acquired Immune Deficiency Syndrome)
Automobile exhaust emissions

Definition: Identifiers are single or multiword subject terms used to express concepts for which there are currently no adequate descriptors. As new concepts and technologies arise, new subject terms not found in existing thesauri are placed in the Identifier field.

Identifiers preceded by an asterisk have the same significance as Descriptors preceded by an asterisk. Identifiers include names of chemical compounds, cities, biological species, computer programs, research projects, scientific instruments, and more.

Field Name: Abstract

Example: Electron spectroscopy has become one of our most important tools for the study of electronic structure of solids and surfaces. Under this contract, we studied the passivation and inhibition of corrosion, utilizing the spectroscopic techniques of x-ray photoelectron absorption fine structure (NEXAFS).

Definition: Abstracts in the NTIS Database may be either indicative or informative, based on the type of document. Informative abstracts identify the methods, results, applications, and conclusions. Indicative abstracts describe content or scope, i.e., a handbook of chemical formulas, chapter titles, or table of contents of a textbook.

Abstracts are usually limited to 200 words. The NTIS database contains a mixture of author and NTIS-written abstracts. Many of the author abstracts are modified by NTIS. Since 1980, no modifications have been made to abstracts prepared by the Department of Defense, Department of Energy or the National Aeronautics and Space Administration.

Field Name: Title Annotation

Example: Reprint: Comparison of Variance Estimators of the Horvitz-Thompson Estimator for Randomized Variable Probability Systematic Sampling.

Definition: This field provides an additional description about the information product.

Note: *This is not a searchable field. However, some online vendors place this information in the document type field. This will be defined further under Search Hints.*

Online Searching Hints

Section III

Abbreviations

Abstracts and other fields often contain abbreviations. However, all subject terms are spelled out in the descriptor or identifier fields.

Accession Numbers (also known as NTIS Order Numbers)

NTIS order numbers consist of this pattern: alpha character-4 digit year-six digits-three letter code.

Example: PBYYYY-123456XAB may be truncated as PBYYYY-123456 truncation symbol number.

When searching, truncate the number after the sixth digit. When searching for an NTIS order number there are two options: (1) to display a list of the neighboring order numbers to select the correct number and closing 3-letter code or; (2) to truncate the order number after the sixth digit following the year number.

NTIS produces PB numbers with a first digit or first two-digit number series designating a type of information product:

Example:

Subscription products—Sub	PB2001-9
Computer Products	PB2001-5
Computer Product Subscriptions	PB2001-59

(Each example should be followed by a truncation symbol, which varies by online vendor.)

Some agencies that maintain their own number series are noted in the accession number field description. The NTIS accession/order number is not always the same as the host vendor's. Searchers should review the record format and field qualifiers of the vendor(s) of their choice.

Searching for report numbers in the NTIS Database requires skill because of the punctuation used between letters and numbers. The above examples are specific to certain product types.

Hint: To limit a search to computer products, in addition to using descriptor or identifier terms such as "data file" and "software," combine the set with PBYYYY-5 plus truncation symbol.

Acronyms

NTIS spells out each acronym used in a citation if the author has supplied it, unless it is so common that it would be unnecessary to do so, e.g., DNA for Deoxyribonucleic Acid. Within the abstract, the phrase explaining the acronym is placed first, followed by the acronym in parenthesis. In the identifier field, both the complete phrase and acronym are provided for searching.

Biological Species

Plants, animals, and microorganisms are indexed with their genus and species names and/or the family name. The common name is also indexed if the author has used it and/or if it is known. If a biological subject term is in one of the recommended thesauri, it is posted in the descriptor field.

Examples:
Descriptors: Liriodendron tulipifera
and also Tulip tree.
Descriptors: Mammals; Carnivora; Taxonomy Identifiers:
Hyaena; Hyaena Brisson; Striped Hyaena,
Felidae; Panthera leo persica
Descriptors: Parasitic diseases; Plasmodium
knowlesi; Rhesus monkeys
Identifiers: Laboratory animals

Subject Category Codes/Classification

What they are

NTIS classifies citations into 39 subject categories. Each of these subject categories is divided into subcategories. This method provides sorting categories for both hard and soft sciences.

All subject categories consist of three character codes: two numerics and one alpha character. The numeric codes represent entire categories such as chemistry, environmental pollution and control, civil engineering, et al. The alpha codes are used to designate subcategories within these broad categories. The number of NTIS subcategories posted to an information product average from one to five, although there are some reports with more.

What they do

Although most online searching is conducted using subject index terms (keywords), subject categories are also very important. Subject categories can be combined with keywords to eliminate false retrievals ("hits").

Example: Combining "Lead" with the NTIS subject category 57Y (Toxicology), retrieves report citations about the toxicity of lead, rather than lead use as an additive in iron alloys.

Example: Citations for "Geothermal energy" reports can be retrieved by searching the NTIS category 97P because this category is specific to geothermal energy.

Note: Subject categories may be designated as Category Codes or Subject Headings by the online vendor. Always review field designations in the vendor(s) documentation.

NTIS Subject Categories

Listed in Appendix B are the subject categories NTIS uses to classify new documents. Each subject category is followed by a list of secondary subject categories. Searches can be conducted by using the actual text of a subject category (i.e., management information systems), or using the subject category code (i.e., 70C) that follows each subject. Because each abstract in the database is indexed on all words in the abstract, searching using the subject category code will reduce the number of stray hits and provide a list of more relevant documents.

Category Codes with Asterisks (Highlighted Subject Category Codes)

An asterisk displayed after the subject category code indicates that the report is highlighted for being particularly significant in its content, approach or presentation. To limit a search, use an asterisk with the subject code in the search statement.

Department of Energy (DOE) Subject Category Codes

DOE titles are assigned subject category codes in the identifier field. These codes have the format ERDA/123456 or EDB/662240. These numbers are defined in the publication *International Energy Subject Categories and Scope. Revision 2* (NTIS Order Number: DE 92018520).

Chemical Nomenclature

NTIS uses the chemical names, trade names, CAS registry numbers, and common names included in the document as descriptors or identifiers. For a comprehensive retrieval, search all known names and classes of a compound.

Chemical compounds are listed with their common name, chemical name, and class of compounds. NTIS lists compounds hierarchically with their chemical classes posted in the descriptor field as well as the individual chemical name. If numerous chemical compounds are the subjects of the research, the classes of compounds are generally listed, but not each individual chemical compound.

Standard chemical abbreviations for the elements may be used in the abstracts, but the name of the element is always posted in its entirety in the descriptor field. Chemical elements may also be posted in their element groups, such as alkali metals, alkaline earth metals, rare earth metals, etc.

Examples:
Descriptors: Hydrochloric acid
Chlorine
Anilines
Amines

Examples

1. Descriptors: Chlorobenzenes (general class)
   Identifiers: Trichlorobenzenes
   1,2,4-Trichlorobenzene
   1,2,3-Trichlorobenzene
2. Descriptors: Metals
   Platinum
   Precious metals (general class)
   Rhodium
3. Descriptor: Chlorobenzenes (general class)
   Identifier: Pentachlorobenzene (specific compound not found in recognized thesauri)
4. Descriptors: Chlorine organic compounds (general class)
   Chlorobenzenes
   Chloroform
   Carbon tetrachloride
5. Inorganic compounds not found in thesauri:
   Lead acetate
   Descriptor: Lead inorganic compounds
   Identifier: Lead acetate

Since 1979, the Chemical Abstract Service's (CAS) Registry Number System cites unique numbers if they are mentioned in the item being indexed. Registry numbers are recorded in two formats: the standard format *with* dashes between numbers, or the abbreviated format *without* dashes. Thus the number may appear as "CAS Registry No: 10016-20-3" or as "CAS Registry No: 10016203" in the identifier field. It may also be known as "CAS No. 10016-20-3." Each online supplier has a field qualifier for these numbers.

Example:
Identifier: Chloramines, CAS 7782505.
Identifier: Formaldehyde, CAS 50-00-0.

For industrial chemicals, pesticides, and pharmaceuticals, NTIS uses the Chemical Abstracts Service nomenclature and the approved common name. NTIS uses the United States Adopted Names (USAN) (Reference No.) when classifying drugs.

Example:
Descriptor: Metal Complexes
Identifier: FDDC [Bis(trifluoroethyl)dithiocarbamate]

Example:
Descriptor: Chlorinated aromatic hydrocarbons
Identifier: PCBs(Polychlorinated biphenyls)
Polychlorinated biphenyls

Chemical Trade Names

Trade names such as Nylon are posted in addition to the generic plastic or polymer name.

Example: Descriptors: Nylon, Polyamide resins.

Computer Programs and Products

Computer products include data files and software available on magnetic tape, diskette, CD-ROM, videotapes, and optical disks.

Search for items that identify programs and products by adding the terms "software," "computer programs," "datafile," and/or "model-simulation" whenever applicable. When searching for computer programs in machine-readable form, combine the terms "software" or "computer program" and the terms "magnetic tape" or "diskette," (found in the Title Note field, see p. 11 of this manual) using the appropriate field qualifier.

Corporate Sources

Two types of corporate sources are found in the NTIS database: performing organization(s) and sponsoring organization(s).

Performing Organization(s)

Most reports are cataloged with the name of the organization(s) that prepared the report. When searching for corporate sources for the years prior to 1980, users must be aware of the cataloging differences caused by multiple agency rules. These differences generally occurred in abbreviations and in punctuation. In 1980, NTIS created a corporate source authority database and a nine-digit code for each corporate source, eliminating these discrepancies. The nine-digit codes appear in each citation.

Sponsoring Organization(s)

The sponsoring organization is always a government agency. The sponsoring organization is listed if it is also the performing organization. Beginning with NTIS Database GRA&I issue 74-21, reports cataloged by NTIS have included the sponsoring organization as well as the performing organization. Beginning with NTIS Database GRA&I issue 76-21, DOE reports have been cataloged with the sponsoring organization.

Examples of performing organization(s) and sponsoring organization(s) in the same report(s):

Example: PB94-171444XAB
P.O. Emory Univ., Atlanta, Ga., Carter Center
S.O. Agency for International Development, Washington, D.C. Bureau for Latin America and the Caribbean

Example: PB94-173358XAB
P.O. North Carolina State Univ. at Raleigh. Sea Grant Coll. Program
S.O. North Carolina Dept. of Environment, Health, and Natural Resources

Example: DE94003817XAB
P.O. Westinghouse Savannah River Co., Aiken, SC
S.O. Department of Energy, Washington, DC

See also listing under "Sponsoring agency keyword acronyms" on page 19.

Data

Reports containing large amounts of tabular data are tagged by the keywords "Tables (Data)" or "Statistical data."

Delimited/Declassified Reports

Declassified materials and reports with limited distribution status are added to the NTIS Database with the date it was acquired by NTIS, rather than the date the report was prepared. Generally the phrase, "Distribution limitation now removed" will be included in the Supplemental Notes in any record for declassified/delimited materials.

Department of Defense (DoD) Declassified/Delimited Items

Declassified reports from the Department of Defense contain a special searchable code in the identifier field: NTISDODXA, NTISDODXB, NTISDODXD, etc. Using this code as a search term restricts a search to declassified reports, or, alternatively, to ensure that no such reports are included in the final search results. Between 1975 and 1977, more than 30,000 declassified items were added to the database. After 1977, NTIS receives documents from DOD as they are declassified. It is advisable to look for the phrase, "Distribution limitation now removed" on DOD reports in addition to the code.

Developing Countries

NTIS announces reports for and about developing countries. Since 1979, NTIS has used the descriptor "developing country application" for titles relevant to foreign governments. Reports about a developing country are usually indexed with one of the following descriptors: "developing countries" or "developing nations." See also subject category code 96G and 96H.

Environmental Impact Statements (EIS)

Environmental Impact Statements are the environmental reviews required for major federal projects that might adversely affect the environment. All previously released EIS were announced through the NTIS Database beginning with the June 1, 1971 update and ending with the April 15, 1974 update. Since then, NTIS has received irregular shipments of EIS.

Most of these environmental impact statements can be searched by entering the term, "environmental impact statements-Final" or "environmental impact statements-Draft" in the descriptor or identifier field. Some early EIS were not assigned either of these terms; however, they can be retrieved by searching for the prefix "EIS" as part of the NTIS accession/order number, truncating after the first three characters of the number, and using the appropriate field qualifier.

Another method of selecting EIS is to use the NTIS subject category code Environmental Impact Statements, 68H.

Note: *This subcategory has been in use since March 15, 1973.*

Foreign Language

In 1979, NTIS created a field to classify reports written in a language other than English. Prior to 1979, reports in foreign languages were mentioned in the notes field. English cannot be searched directly.

Reports of Non-U.S. Origin

Country names are assigned in the descriptor or identifier fields. Using a country name in the descriptor or identifier field searches for reports about that country.

Country names in citations prior to 1980 indicate that the document either originated in that country or that the document is about that country. In 1980, a field for country of publication was added to the bibliographic citation when the source country was other than United States. Since country codes are not assigned to documents originating in the United States, non-U.S. items can be eliminated using NOT logic.

Note: Each online supplier provides search instructions for documents originating in the United States.

Foreign Research and Technology

In 1979, NTIS began using the subject term "foreign technology" to identify documents about current foreign research, techniques, and technology. Many of these reports have been prepared outside of the U.S., and include documents published as a result of fellowships or research programs awarded to foreign nationals and sponsored by U.S. government agencies.

International Business Information

The NTIS Database contains a substantial amount of non-U.S. business-related information especially in the areas of science, engineering and technology. Reports include foreign market surveys, foreign sectoral analysis, industry subsector analysis, and other economic studies. Key sources of this type of information are: the U.S. Trade and Development Program, the International Trade Administration, and the Department of Commerce's Office of General Counsel. Titles are posted with "export trade information" and/or "foreign marketing" identifiers.

Note: The terms foreign marketing and foreign technology are different. For example, tourism doesn't have a technology component, but it does have a marketing component.

See also listing under "translations" on page 19.

Geographical Areas

Geographic location is included only when it is an important facet of an indexed item.

The following indexing guidelines apply:

1. Items referring to an area in a country covering two or more states or provinces are indexed to the region and not the individual states or provinces:

Example: Central Regions (United States)
Great Plains Region (United States)
New England (exception- region not included)

2. Reports referring to individual states, provinces, or parts of states within a country are indexed to the states, provinces, and its parent political unit:

Example: Northwest Region (Iowa)
Ozark Region (Missouri)
Northern Region (Virginia)

3. States and other political regions, including cities, are modified with the country name except for those of Great Britain, Canada and the United States. They may be posted in the descriptor or identifier field.

Example: Arkansas
Bavaria Region (Germany)
British Columbia

4. Coasts are modified with the country or land area and posted in the identifier field:

Example: Atlantic Coast (United States)
Atlantic Coast (Canada)
Gulf Coast (United States)
Pacific Coast (Mexico)

5. Natural features, other than coasts, do not receive a political modifier. The natural feature modifier appears last and is posted in the descriptor field.

Example: Mississippi Delta
Susquehanna River Basin
Mexico Gulf (for Gulf of Mexico)

6. Lakes and mountains appear as they are listed on standard maps. They are posted in the descriptor field.

Example: Alps Mountains (Europe)
Lake Erie
Great Salt Lake

Government-Owned Inventions for Licensing (See also Patents)

Effective with NTIS Database GRA&I Issue 72-23 (Dec. 1, 1972), NTIS began to announce all patents and patent applications issued to U.S. government agencies that are available for public licensing.

Hint: U.S. government-owned applications can be searched by combining the terms "patents" or "patent applications" with NTIS Subject Category 90. If NTIS subject category 90 is not combined with either of these terms, foreign patents will also be retrieved.

Health Care/Medicine Subjects

Since 1980, NTIS has used the National Library of Medicine's thesaurus, Medical Subject Headings-Annotated Alphabetic Listing, as its indexing authority for reports in the health care and medicine fields. The subject categories specific to this subject are:

- Medicine & Biology (57);
- Health Care (44); and
- Biomedical Technology and Human Factors Engineering (95).

Three subcategories specific to this subject are:

- Urban and Regional Technology and Development–Health Services (91F);
- Problem Solving for State and Local Governments–Human resources (43C); and Police, Fire and Emergency Services (43D).

Journal Reprints

NTIS receives and announces approximately 500 - 600 journal reprints each year. About half of these articles are originated by the U.S. Department of Defense; others are from the National Institute of Standards and Technology (formerly National Bureau of Standards) and the Environmental Protection Agency.

Some journal articles are available from NTIS depending upon the funding agency. Beginning with NTIS Database GRA&I issue 75-03, February 1975, the descriptor "reprints" has been assigned to the majority of the reprints. The document type is also noted as a journal article.

Maps

The descriptor "maps" is used whenever maps are an integral part of a report. Reports describing the way maps are made are indexed with the descriptor "mapping."

Patents

All U.S. government patents and patent applications entered into the NTIS Database are assigned either "patents" or "patent applications" in the descriptor or title note field. Some online vendors display it as the document type field.

Sponsoring Agency Keyword Acronyms

Effective with NTIS Database issue 7309, May 1973, NTIS placed an acronym representing the report's sponsoring organization(s) in the identifier field. This information can also be found by entering the agency name as a search term in the corporate source/sponsoring agency field.

Beginning with NTIS Database issue 7419, October 1974, the agency acronyms are prefixed with the "NTIS" acronym.

Examples:

NTISDE	Department of Energy
NTISDOD	Department of Defense
NTISNASA	NASA
NTISCOMNBS	National Institute of Standards & Technology (NIST).

Note: This acronym combines the Department of Commerce and the former agency name of National Bureau of Standards (NBS).

These codes are helpful when searching for sponsoring organizations rather than performing organizations, or to find all reports submitted to NTIS by one specific agency.

Note: Although a complete list of these source agency acronyms is not available, the meaning of an agency acronym often may be determined from the corporate source field.

Superfund

The U.S. Environmental Protection Agency (EPA) administers the Superfund program, which was established in 1980 with the passage of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In 1986, Congress passed the Superfund Amendment and Reauthorization Act (SARA) which updated and improved CERCLA.

All publicly available documents from the Office of Emergency and Remedial Response (OERR) are available from NTIS.

Hint: Use the descriptor "Superfund" to locate relevant documents, such as Superfund Record of Decision reports.

Translations

Each year, NTIS announces approximately 1,000 translations received from and funded by government agencies. Prior to 1976, all translations, except those originating with DOE and NASA, were assigned the descriptor "translations." Since 1976, DOE and NASA translations also have been indexed with "translations."

See also listing under "foreign language."

Verbalization

All subscripts, superscripts, Greek letters, scientific and mathematical formulae are fully spelled out in the abstract of the record.

Example: alpha, beta, gamma, etc.
Peroxide appears as H2O2 or H sub 2 O sub 2.
Water appears as H2O or H sub 2 O

Selected References for Assistance in Searching the NTIS Database

Section IV

Items with an asterisk (*) are available from NTIS; U.S. Department of Commerce, NTIS, Springfield, VA 22161. When ordering, you will need the NTIS order number as indicated. Your ordering options include: Online - insert order number as requested at http://www.ntis.gov/support/orderingpage.htm, By phone (NTIS Sales Desk) - 1-800-553-6847 or 703-605-6000, Fax - 703-605-6900, via e-mail - orders@ntis.gov

The NTIS Sales Desk is available for assistance 8 a.m. - 6 p.m.; EST, Monday-Friday. The Sales representative will verify a title, order number or price for you. For further ordering information see the NTIS Web page at http://www.ntis.gov/support/orderingpage.htm

Many of these references are made available online on the source agency's web site. Where available, these web addresses are listed at the end the entry.

***Countries, Dependencies, Areas of Special Sovereignty, and Their Principal Administrative Divisions.**
NTIS Order No.: FIPS PUB 10-4
For diskette, NTIS Order No.: PB95-503504, $30

***Guidelines for Descriptive Cataloging of Reports: A Revision of COSATI Standard for Descriptive Cataloging of Government Scientific and Technical Reports.**
NTIS Order No.: PB86-112349

NTIS DIALOG Information Services, Inc. (File 6) Bluesheets.
DIALOG Information Services, Inc. Includes field-by-field description of DIALOG system search capabilities.
http://library.dialog.com/bluesheets/html/bl0006.html

List of Applicable Thesauri

***Defense Technical Information Center Thesaurus.**
Defense Technical Information Center, Alexandria, Va.
NTIS Order No.: AD-A 321 038
http://stinet.dtic.mil/str/index.html

International Energy Subject Thesaurus.
Janunary 1998
DOE report no.: ETDE/PUB-2 (Rev.1). Contains over 21,000 terms and includes definitions, entry date, and broader and narrower terms.
http://www.etde.org/edb/download.html

International Energy Subject Thesaurus Supplement.
Updated monthly.
http://www.etde.org/edb/download.html

***Medical Subject Headings, Annotated Alphabetic List.**
Alphabetical listing of all subject descriptors used by the indexers and catalogers at the National Library of Medicine (NLM). Update annually, for information about ordering from NTIS, go to http://www.ntis.gov/product/medline.htm
http://www.nlm.nih.gov/mesh/MBrowser.html

***NASA Thesaurus, Volume 1: Hierarchical Listing.**
January 1998.
Contains over 25,000 subject terms that are used in the NASA Scientific and technical information system
NTIS Order No.: N1998-0010926
http://www.sti.nasa.gov/thesfrm1.htm

***NASA Thesaurus, Volume 2: Rotated Term Display.**
January 1998.
NTIS Order No.: N1998-0010863
http://www.sti.nasa.gov/thesfrm1.htm

***NASA (National Aeronautics and Space Administration) Thesaurus Supplement: A Three-Part Cumulative Supplement to the 1998 Edition of the NASA Thesaurus.**

The supplement to the 1998 edition of the *NASA Thesaurus* includes all new terms and associated heirarchies added since the cutoff for the 1998 edition (December 1997).
NTIS Order No.: N2001-0019519
http://www.sti.nasa.gov/thesfrm1.htm

TEST: Thesaurus of Engineering and Scientific Terms.
1967. Available from American Association of Engineering Societies, 1111 19th St, NW, Suite 403, Washington, D.C., 20036. 1-888-400-2237 or (202)296-2237.

Transportation Research Thesaurus (TRT).
July 1999. CD-ROM or paper copy available from CDB Enterprises, Inc.
Davidbatty@aol.com; Telephone: 301-593-8901.

***Thesaurus of Water Resources Terms: A Collection of Water Resources and Related Terms for Use in Indexing Technical Information**
1989. Bureau of Reclamation, Denver CO.
NTIS Order No.: PB95-146213

Gov.Research_Center (GRC)

The Gov.Research_Center - http://grc.ntis.gov is a partnership between:

National Information Services Corporation, NISC USA
Wyman Towers
3100 St. Paul Street
Baltimore, MD 21218
http://www.nisc.com
Telephone: 1-410-243-0797
Fax: 410-243-0982
E-mail: sales@nisc.com

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161
http://www.ntis.gov
Telephone: 800-363-2068
Fax: 703-605-6880
E-mail: grchelp@ntis.gov

The GRC supports three separate search levels (i.e. Quick, Advanced, and Expert Search). Two configurations of NTIS Database subscription products are available. The first option is the NTIS Database dating from 1990 to current, while the second option is the complete NTIS Database file containing bibliographic records from 1964 to current. The NTIS GRC Help Desk e-mail address is grchelp@ntis.gov, and the phone number is (703) 605-6660.

Expert Fields Guide

Search Field Tag	*Search Field/Contents*	*Index Type*
AN	NTIS Order Number	Item
AU	Author	Item
{No tag}	Keywords/Phrase (Title, Index Terms and Notes)	Word/Phrase
IA	Institutional Author	Word/Phrase
KT	Index Terms	Item
LA	Language	Item
MT	Major Topic	Item
JA	NTIS Journal Announcement	Item
NO	Numbers (Report, Contract, Grant, Project Task, and ISBN)	Item
PO	Performing Organization	Word/Phrase
PP	Publication Place	Item
PT	Publication Type	Item
PY	Publication Year	Item
AE	Source Agency	Item
SP	Sponsor	Word/Phrase
TI	Title	Word

General subject or free-text searching is done in the “Key words/Phrase” field. This search field simultaneously scans the most commonly queried fields of descriptive text, e.g., Title, Abstract, Notes, Place-Names, Index Terms, Descriptors, and Identifiers and Full-Text if available. Other fields such as Author, Source, Journal Title, Publication Year, etc., must be searched separately - these types of fields are not included in the general subject searching in order to minimize irrelevant results from false hits on words found in these fields.

To begin, type your search criteria in the fields provided. Incorporate search operators including Boolean (and, or, not), truncation (*,?), range(>,<,>=,<=), proximity (nearX and adjX) to exclude unwanted records, as well as retrieve intended, meaningful records. Use parenthesis () to group and order the processing of search terms according to your search needs.

Use the **Help** and **Index** features located to the right of each search field to aid in the selection of search terms.

NTIS on GRC Sample Record	
TITLE:	United States Domestic Progress on Climate Change
INSTITUTIONAL AUTHOR:	Global Change Research Program, Washington, D.C.
SPONSOR:	National Science and Technology Council,
	Washington, DC
LANGUAGE:	English
PUBLICATION TYPE:	Technical Report
PUBLICATION PLACE:	United States
SOURCE AGENCY:	Other (SOLO), Nov 2000, CD-ROM
NTIS ORDER NUMBER:	Add to order - PB2001-10447INW Review Order
PRICE:	USA, Canada & Mexico: Audio-Visual $27
	Other countries: Audio-Visual $54.00
AVAILABILITY:	Order this product from NTIS by phone:
	1-800-553-NTIS (U.S. customers); (703) 605-6000
	(other countries); fax at (703) 605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA 22161, USA. This document is color dependent and/or in landscape layout. It is currently only available on CD-ROM.
ABSTRACT:	Addressing climate change is the premier environmental challenge of the 21st century. Among the worlds leading atmospheric scientists, agreement is now widespread that the Earth is warming and that greenhouse gas emissions from human activities are at least partly to blame. The United States is committed to meeting this challenge, both through domestic actions to reduce greenhouse gas emissions and through environmentally sound, cost-effective international cooperation under the United Nations Framework Convention on Climate Change and its 1997 Kyoto Protocol. Awareness is growing throughout U.S. society that global warming is a serious problem and that serious action is required. Most importantly, specific concrete actions by citizens, businesses, and governments are yielding tangible results. In fact, recent data show that growth in U.S. greenhouse gas emissions has begun to decline, even as the U.S. economy grows at an unprecedented rate, an important measure of progress in the fight against climate change.
KEY TERMS:	*Climate change; *Government policies; *Greenhouse effect; *Agriculture; Alternative energy sources; Biomass; Buildings; Carbon Dioxide; Electricity; Forestry; Transportation industry
SUBJECT CATEGORY:	Atmospheric Sciences [55]; Environmental Pollution & Control - Air Pollution & Control [68A]; Energy-Environmental Studies [97R]

NTIS Subject Categories
Alphabetical Listing by Major Categories

Appendix A

70-Administration & Management
700-General
70A-Inventory Control
70B-Management Practice
70C-Management Information Systems
70D-Personnel Management, Labor Relations & Manpower Studies
70E-Research Program Administration & Technology Transfer
70F-Public Administration & Government
70G-Productivity

51-Aeronautics & Aerodynamics
510-General
51A-Aerodynamics
51B-Aeronautics
51C-Aircraft
51D-Parachutes & Decelerators
51E-Avionics
51F-Test Facilities & Equipment

98-Agriculture & Food
980-General
98A-Agricultural Chemistry
98B-Agricultural Economics
98C-Agricultural Equipment, Facilities, & Operations
98D-Agronomy, Horticulture, & Plant Pathology
98E-Animal Husbandry & Veterinary Medicine
98F-Fisheries & Aquaculture
98G-Agriculture Resource Surveys
98H-Food Technology

54-Astronomy & Astrophysics
540-General
54A-Astrogeology
54B-Astronomy & Celestial Mechanics
54C-Astrophysics
54D-Cosmic Ray Research

55-Atmospheric Sciences
550-General
55A-Aeronomy
55B-Dynamic Meteorology
55C-Meteorological Data Collection, Analysis, & Weather Forecasting
55D-Meteorological Instruments & Instrument Platforms
55E-Physical Meteorology
55F-Weather Modification

92-Behavior & Society
920-General
92A-Job Training & Career Development
92B-Psychology
92C-Social Concerns
92D-Education, Law, & Humanities
92E-International Relations

95-Biomedical Technology & Human Factors Engineering
950-General
95A-Prosthetics & Mechanical Organs
95B-Tissue Preservation & Storage
95C-Biomedical Instrumentation & Bioengineering
95D-Human Factors Engineering
95E-Life Support Systems
95F-Bionics & Artificial Intelligence
95G-Protective Equipment

89-Building Industry Technology
890-General
89B-Architectural Design & Environmental Engineering
89C-Construction Management & Techniques
89D-Structural Analyses
89E-Building Standards & Codes
89G-Construction Materials, Components, & Equipment
89H-Building Equipment, Furnishings, & Maintenance

96-Business & Economics
960-General
96A-Domestic Commerce, Marketing, & Economics
96C-International Commerce, Marketing, & Economics
96D-Consumer Affairs
96E-Minority Enterprises
96F-Banking & Finance
96G-Foreign Industry Economic Development
96H-Foreign Business & Economics

99-Chemistry

990-General
99A-Analytical Chemistry
99B-Industrial Chemistry & Chemical Process Engineering
99C-Polymer Chemistry
99D-Basic & Synthetic Chemistry
99E-Photochemistry & Radiation Chemistry
99F-Physical & Theoretical Chemistry

50-Civil Engineering

500-General
50A-Highway Engineering
50B-Civil Engineering
50C-Construction Equipment, Materials, & Supplies
50D-Soil & Rock Mechanics

81-Combustion, Engines, & Propellants

810-General
81A-Combustion & Ignition
81B-Electric & Ion Propulsion
81C-Fuel & Propellant Tanks
81D-Jet & Gas Turbine Engines
81G-Rocket Engines & Motors
81H-Rocket Propellants
81I-Nuclear Propulsion
81J-Reciprocation & Rotating Combustion Engines

45-Communication

450-General
45A-Policies, Regulations, & Studies
45B-Radio & Television Equipment
45C-Common Carrier & Satellite
45D-Sociopolitical
45E-Graphics
45F-Verbal
45G-Communication & Information Theory

62-Computers, Control & Information Theory

620-General
62A-Computer Hardware
62B-Computer Software
62C-Control Systems & Control Theory
62D-Information Processing Standards
62E-Information Theory
62F-Pattern Recognition & Image Processing
62R-Applications Software
62S-Data Files

63-Detection & Countermeasures

630-General
63A-Acoustic Detection
63B-Electromagnetic & Acoustic Countermeasures
63C-Infrared & Ultraviolet Detection
63D-Magnetic Detection
63E-Nuclear Explosion Detection
63F-Optical Detection
63G-Personnel Detection
63H-Radiofrequency Detection
63I-Seismic Detection

49-Electrotechnology

490-General
49A-Antennas
49B-Circuits
49C-Electromechanical Devices
49D-Electron Tubes
49E-Optoelectronic Devices & Systems
49F-Power & Signal Transmission Devices
49G-Resistive, Capacitive, & Inductive Components
49H-Semiconductor Devices

97-Energy

970-General
97A-Reserves
97B-Energy Use, Supply, & Demand
97E-Electric Power Transmission
97F-Fuel Conversion Processes
97G-Policies, Regulations & Studies
97I-Electric Power Production
97J-Heating & Cooling Systems
97K-Fuels
97L-Engine Studies (Energy Related)
97M-Batteries & Components
97N-Solar Energy
97O-Miscellaneous Energy Conversion & Storage
97P-Geothermal Energy
97Q-Selected Studies In Nuclear Technology
97R-Environmental Studies

68-Environmental Pollution & Control

680-General
68A-Air Pollution & Control
68B-Noise Pollution & Control
68C-Solid Wastes Pollution & Control
68D-Water Pollution & Control
68E-Pesticides Pollution & Control
68F-Radiation Pollution & Control
68G-Environmental Health & Safety
68H-Environmental Impact Statements

90-Government Inventions for Licensing

900-General
90A-Mechanical Devices & Equipment
90B-Chemistry
90C-Nuclear Technology
90D-Biology & Medicine
90E-Metallurgy
90F-Electrotechnology
90G-Instruments
90H-Optics & Lasers
90I-Ordnance
90J-Food Technology

44-Health Care

440-General
44A-Planning Methodology
44B-Agency Administrative & Financial Management
44C-Community & Population Characteristics
44D-Health Care Assessment & Quality Assurance
44E-Health Care Measurement Methodology
44F-Health Care Forecasting Methodology
44G-Environmental & Occupational Factors
44H-Health Care Technology
44J-Health Delivery Plans, Projects & Studies
44K-Health Services
44L-Health Care Needs & Demands
44M-Health Resources
44N-Health Care Utilization
44P-Health Education & Manpower Training
44Q-Health-Related Costs
44R-Economics & Sociology
44S-Legislation & Regulations
44T-Data & Information Systems
44U-Health Care Delivery Organization & Administration

94-Industrial & Mechanical Engineering

940-General
94A-Production Planning & Process Controls
94B-Quality Control & Reliability
94C-Plant Design & Maintenance
94D-Job Environment
94E-Environmental Engineering
94F-Tooling, Machinery, & Tools
94G-Manufacturing Processes & Materials Handling
94H-Industrial Safety Engineering
94I-Hydraulic & Pneumatic Equipment
94J-Nondestructive Testing
94K-Laboratory & Test Facility Design & Operation

88-Library & Information Sciences

880-General
88A-Operations & Planning
88B-Information Systems
88C-Marketing & User Services
88D-Personnel
88E-Reference Materials

41-Manufacturing Technology

410-General
41A-Computer Aided Design (CAD)
41B-Computer Aided Manufacturing (CAM)
41C-Robotics/Robots
41D-Productivity
41E-Manufacturing, Planning, Processing & Control
41F-Joining
41G-Quality Control & Reliability
41H-Plant Design & Maintenance
41I-Job Environment
41J-Tooling, Machinery, & Tools
41K-Engineering Materials
41L-Tribology
41M-Optics & Lasers
41N-Computer Software
41O-Domestic Commerce, Marketing, & Economics
41P-Research Program Administration & Technology Transfer

71-Materials Sciences

710-General
71A-Ablative Materials & Ablation
71B-Adhesives & Sealants
71C-Carbon & Graphite
71D-Ceramics, Refractories, & Glass
71E-Coatings, Colorants, & Finishes
71F-Composite Materials
71G-Corrosion & Corrosion Inhibition
71H-Elastomers
71I-Fibers & Textiles
71J-Iron & Iron Alloys
71K-Lubricants & Hydraulic Fluids
71L-Materials Degradation & Fouling
71M-Miscellaneous Materials
71N-Nonferrous Metals & Alloys
71O-Plastics
71P-Refractory Metals & Alloys
71Q-Solvents, Cleaners, & Abrasives
71R-Wood & Paper Products

72-Mathematical Sciences

720-General
72B-Algebra, Analysis, Geometry, & Mathematical Logic
72E-Operations Research
72F-Statistical Analysis

57-Medicine & Biology

570-General
57A-Anatomy
57B-Biochemistry
57C-Botany
57D-Clinical Chemistry
57E-Clinical Medicine
57F-Cytology, Genetics, & Molecular Biology
57G-Dentistry
57H-Ecology
57I-Electrophysiology
57J-Immunology
57K-Microbiology
57L-Nutrition
57M-Occupational Therapy, Physical Therapy, & Rehabilitation
57N-Parasitology
57O-Pathology
57P-Pest Control
57Q-Pharmacology & Pharmacological Chemistry
57S-Physiology
57T-Psychiatry
57U-Public Health & Industrial Medicine
57V-Radiobiology
57W-Stress Physiology
57X-Surgery
57Y-Toxicology
57Z-Zoology

74-Military Sciences

740-General
74A-Antiaircraft Defense Systems
74B-Antimissile Defense Systems
74C-Antisubmarine Warfare
74D-Chemical, Biological, & Radiological Warfare
74E-Logistics, Military Facilities, & Supplies
74F-Military Intelligence
74G-Military Operations, Strategy, & Tactics
74H-Nuclear Warfare
74I-Passive Defense Systems

75-Missile Technology

750-General
75A-Air & Space-Launched Missiles
75B-Missile Guidance & Control Systems
75C-Missile Launching & Support Systems
75D-Missile Tracking Systems
75E-Missile Trajectories & Reentry Dynamics
75F-Missile Warheads & Fuses
75G-Surface-Launched Missiles
75H-Underwater-Launched Missiles

48-Natural Resources & Earth Sciences

480-General
48A-Mineral Industries
48B-Natural Resource Management
48C-Natural Resource Surveys
48D-Forestry
48E-Soil Sciences
48F-Geology & Geophysics
48G-Hydrology & Limnology
48H-Snow, Ice, & Permafrost
48I-Cartography

76-Navigation, Guidance, & Control

760-General
76A-Control Devices & Equipment
76B-Guidance Systems
76C-Navigation & Guidance System Components
76D-Navigation Systems

77-Nuclear Science & Technology

770-General
77A-Fusion Devices (Thermonuclear)
77B-Isotopes
77C-Nuclear Auxiliary Power Systems
77D-Nuclear Explosions & Devices
77E-Nuclear Instrumentation
77F-Radiation Shielding, Protection, & Safety
77G-Radioactive Wastes & Radioactivity
77H-Reactor Engineering & Nuclear Power Plants
77I-Reactor Fuels & Fuel Processing
77J-Reactor Materials
77K-Reactor Physics

47-Ocean Sciences & Technology

470-General
47A-Marine Engineering
47B-Dynamic Oceanography
47C-Physical & Chemical Oceanography
47D-Biological Oceanography
47E-Marine Geophysics & Geology
47F-Oceanographic Vessels, Instruments, & Platforms
47G-Hydrography

47H-Underwater Construction & Habitats

79-Ordnance

790-General
79A-Ammunition, Explosives, & Pyrotechnics
79B-Armor
79C-Bombs
79D-Combat Vehicles
79E-Detonations, Explosion Effects, & Ballistics
79F-Fire Control & Bombing Systems
79G-Guns
79H-Rockets
79I-Underwater Ordnance

82-Photography & Recording Devices

820-General
82A-Holography
82B-Photographic Techniques & Equipment
82C-Recording Devices

46-Physics

460-General
46A-Acoustics
46B-Fluid Mechanics
46C-Optics & Lasers
46D-Solid State Physics
46E-Structural Mechanics
46G-Plasma Physics
46H-Radiofrequency Waves

43-Problem-Solving Information for State & Local Governments

430-General
43A-Finance
43B-Economic & Community Development
43C-Human Resources
43D-Police, Fire, & Emergency Services
43E-Energy
43F-Environment
43G-Transportation

84-Space Technology

840-General
84A-Astronautics
84B-Extraterrestial Exploration
84C-Manned Spacecraft
84D-Spacecraft Trajectories & Flight Mechanics
84E-Space Launch Vehicles & Support Equipment
84F-Space Safety
84G-Unmanned Spacecraft

85-Transportation

850-General
85A-Air Transportation
85C-Metropolitan Rail Transportation
85D-Transportation Safety
85E-Pipeline Transportation
85F-Global Navigation Systems
85G-Marine & Waterway Transportation
85H-Road Transportation
85I-Railroad Transportation

91-Urban & Regional Technology & Development

910-General
91A-Environmental Management & Planning
91B-Transportation & Traffic Planning
91C-Fire Services, Law Enforcement, & Criminal Justice
91D-Communications
91E-Housing
91F-Health Services
91G-Urban Administration & Planning
91H-Regional Administration & Planning
91I-Emergency Services & Planning
91J-Economic Studies
91K-Social Services
91L-Recreation

NTIS Subject Categories
Alphabetical Listing by All Categories

Appendix B

Ablative Materials and Ablation ..... (71A)
Acoustic Detection ..... (63A)
Acoustics ..... (46A)
Adhesives and Sealants ..... (71B)
Administration and Management ..... (70)
Aerodynamics ..... (51A)
Aeronautics ..... (51B)
Aeronautics -Test Facilities and Equipment ..... (51F)
Aeronautics and Aerodynamics ..... (51)
Aeronomy ..... (55A)
Agricultural Chemistry ..... (98A)
Agricultural Economics ..... (98B)
Agricultural Equipment, Facilities, and Operations ..... (98C)
Agricultural Resource Surveys ..... (98G)
Agriculture and Food ..... (98)
Agronomy, Horticulture, and Plant Pathology ..... (98D)
Air and Space-Launched Missiles ..... (75A)
Air Pollution and Control ..... (68A)
Air Transportation ..... (85A)
Aircraft ..... (51C)
Algebra, Analysis, Geometry, and Mathematical Logic ..... (72B)
Ammunition, Explosives, and Pyrotechnics ..... (79A)
Analytical Chemistry ..... (99A)
Anatomy ..... (57A)
Animal Husbandry and Veterinary Medicine ..... (98E)
Antennas ..... (49A)
Antiaircraft Defense Systems ..... (74A)
Antimissile Defense Systems ..... (74B)
Antisubmarine Warfare ..... (74C)
Architectural Design and Environmental Engineering ..... (89B)
Armor ..... (79B)
Astrogeology ..... (54A)
Astronautics ..... (84A)
Astronomy and Astrophysics ..... (54)
Astronomy and Astrophysics Cosmic Ray Research ..... (54D)
Astronomy and Celestial Mechanics ..... (54B)
Astrophysics ..... (54C)
Atmospheric Sciences ..... (55)
Atmospheric Sciences Dynamic Meteorology ..... (55B)
Avionics ..... (51E)
Banking and Finance ..... (96F)
Basic and Synthetic Chemistry ..... (99D)
Batteries and Components ..... (97M)
Behavior and Society ..... (92)
Biochemistry ..... (57B)
Biological Oceanography ..... (47D)
Biomedical Instrumentation and Bioengineering ..... (95C)
Biomedical Technology and Human Factors Engineering ..... (95)
Bionics and Artificial Intelligence ..... (95F)
Bombs ..... (79C)
Botany ..... (57C)
Building Construction Management and Techniques ..... (89C)
Building Construction Materials, Components, and Equipment ..... (89G)
Building Equipment, Furnishings, and Maintenance ..... (89H)
Building Industry Technology ..... (89)
Building Standards and Codes ..... (89E)
Building Structural Analyses ..... (89D)
Business - Foreign Industry Development and Economics ..... (96G)
Business - International Commerce, Marketing, and Economics ..... (96C)
Business and Economics ..... (96)
Business Domestic Commerce, Marketing, and Economics ..... (96A)
Carbon and Graphite ..... (71C)
Cartography ..... (48I)
Ceramics, Refractories, and Glass ..... (71D)
Chemical, Biological, and Radiological Warfare ..... (74D)
Chemistry ..... (99)
Chemistry - Physical and Theoretical ..... (99F)
Chemistry - Photo and Radiation ..... (99E)
Circuits ..... (49B)
Civil Engineering ..... (50B)
Civil Engineering (Heading) ..... (50)

Civil Engineering Construction Equipment, Materials, and Supplies ..... (50C)
Clinical Chemistry ..... (57D)
Clinical Medicine ..... (57E)
Coatings, Colorants, and Finishes ..... (71E)
Combat Vehicles ..... (79D)
Combustion and Ignition ..... (81A)
Combustion, Engines and Propellants Electric and Ion Propulsion ..... (81B)
Combustion, Engines, and Propellants ..... (81)
Common Carrier and Satellite ..... (45C)
Communication ..... (45)
Communication Graphics ..... (45E)
Communication and Information Theory ..... (45G)
Communication Policies, Regulations, and Studies ..... (45A)
Communications - Sociopolitical ..... (45D)
Communications - Verbal ..... (45F)
Composite Materials ..... (71F)
Computer Aided design (CAD) ..... (41A)
Computer Aided Manufacturing (CAM) ..... (41B)
Computer Control Systems and Control Theory ..... (62C)
Computer Hardware ..... (62A)
Computer Information Processing Standards ..... (62D)
Computer Information Theory ..... (62E)
Computer Software ..... (62B)
Computers, Control, and Information Theory ..... (62)
Consumer Affairs ..... (96D)
Corrosion and Corrosion Inhibition ..... (71G)
Cytology, Genetics, and Molecular Biology ..... (57F)
Dentistry ..... (57G)
Detection and Countermeasures ..... (63)
Detonations, explosion effects, and ballistics ..... (79E)
Dynamic Oceanography ..... (47B)
Ecology ..... (57H)
Education, Law, and Humanities ..... (92D)
Elastomers ..... (71H)
Electric Power Production ..... (97I)
Electric Power Transmission ..... (97E)
Electromagnetic and Acoustic Countermeasures ..... (63B)
Electromechanical Devices ..... (49C)
Electron Tubes ..... (49D)
Electronic Resistive, Capacitive, and Inductive Components ..... (49G)
Electrotechnology ..... (49)
Energy ..... (97)
Energy Environmental Studies ..... (97R)
Energy Policies, Regulations, and Studies ..... (97G)
Energy Reserves ..... (97A)
Energy Use, Supply, and Demand ..... (97B)
Engine Studies (Energy Related) ..... (97L)
Engineering Materials ..... (41K)
Environmental Engineering ..... (94E)
Environmental Health and Safety ..... (68G)
Environmental Impact Statements ..... (68H)
Environmental Pollution and Control ..... (68)
Fibers and Textiles ..... (71I)
Fisheries and Aquaculture ..... (98F)
Fluid Mechanics ..... (46B)
Food Technology ..... (98H)
Forestry ..... (48D)
Fuel and Propellant Tanks ..... (81C)
Fuel Conversion Processes ..... (97F)
Fuels ..... (97K)
Fusion Devices (Thermonuclear) ..... (77A)
Geology and Geophysics ..... (48F)
Geothermal Energy ..... (97P)
Global Navigation Systems ..... (85F)
Government Inventions - Biology and Medicine ..... (90D)
Government Inventions - Chemistry ..... (90B)
Government Inventions - Electrotechnology ..... (90F)
Government Inventions - Food Technology ..... (90J)
Government Inventions - Instruments ..... (90G)
Government Inventions - Mechanical Devices and Equipment ..... (90A)
Government Inventions - Metallurgy ..... (90E)
Government Inventions - Nuclear Technology ..... (90C)
Government Inventions - Optics and Lasers ..... (90H)
Government Inventions - Ordnance ..... (90I)
Government Inventions for Licensing ..... (90)
Guns ..... (79G)
Health Care ..... (44)
Health Care Agency Administrative and Financial Management ..... (44B)
Health Care Assessment and Quality Assurance ..... (44D)

Health Care Community and Population Characteristics ..... (44C)
Health Care Data and Information Systems ..... (44T)
Health Care Delivery Organization and Management ..... (44U)
Health Care Economics and Sociology ..... (44R)
Health Care Environmental and Occupational Factors ..... (44G)
Health Care forecasting Methodology ..... (44F)
Health Care Legislation and Regulations ..... (44S)
Health Care measurement Methodology ..... (44E)
Health Care Needs and Demands ..... (44L)
Health Care Technology ..... (44H)
Health Care Utilization ..... (44N)
Health Delivery Plans, Projects, and Studies ..... (44J)
Health Education and Manpower Training ..... (44P)
Health Planning Methodology ..... (44A)
Health Resources ..... (44M)
Health Services ..... (44K)
Health-Related Costs ..... (44Q)
Heating and Cooling Systems ..... (97J)
Highway Engineering ..... (50A)
Holography ..... (82A)
Human Factors Engineering ..... (95D)
Hydraulic and Pneumatic Equipment ..... (94I)
Hydrography ..... (47G)
Hydrology and Limnology ..... (48G)
Immunology ..... (57J)
Industrial and Mechanical Engineering ..... (94)
Industrial and Mechanical Engineering Plant Design and Maintenance ..... (94C)
Industrial and Mechanical Engineering Production Planning and Process Controls ..... (94A)
Industrial and Mechanical Engineering Quality Control and Reliability ..... (94B)
Industrial Chemistry and Chemical Process Engineering ..... (99B)
Industrial Job Environment ..... (94D)
Industrial Laboratory and Test Facility Design and Operation ..... (94K)
Industrial Safety Engineering ..... (94H)
Infrared and Ultraviolet Detection ..... (63C)
International Relations ..... (92E)
Inventory Control ..... (70A)
Iron and Iron Alloys ..... (71J)
Isotopes ..... (77B)
Jet and Gas Turbine Engines ..... (81D)
Joining ..... (41F)
Library and Information Science Marketing and User Services ..... (88C)
Library and Information Science Personnel ..... (88D)
Library and Information Sciences ..... (88)
Library and Information Sciences Operations and Planning ..... (88A)
Library Information Systems ..... (88B)
Life Support Systems ..... (95E)
Logistics, Military Facilities, and Supplies ..... (74E)
Lubricants and Hydraulic Fluids ..... (71K)
Magnetic Detection ..... (63D)
Management Information Systems ..... (70C)
Management Practice ..... (70B)
Manned Spacecraft ..... (84C)
Manufacturing Job Environment ..... (41I)
Manufacturing Computer Software ..... (41N)
Manufacturing Domestic Commerce, Marketing, and Economics ..... (41O)
Manufacturing Optics and Lasers ..... (41M)
Manufacturing Plant Design and Maintenance ..... (41H)
Manufacturing Processes and Materials Handling ..... (94G)
Manufacturing Productivity ..... (41D)
Manufacturing Quality Control and Reliability ..... (41G)
Manufacturing Research Program Administration and Technology Transfer ..... (41P)
Manufacturing Technology ..... (41)
Manufacturing Tooling, Machinery, and Tools ..... (41J)
Manufacturing, Planning, Processing, and Control ..... (41E)
Marine and Waterway Transportation ..... (85G)
Marine Engineering ..... (47A)
Marine Geophysics and Geology ..... (47E)
Materials Degradation and Fouling ..... (71L)
Materials Sciences ..... (71)
Mathematical Sciences ..... (72)
Medicine and Biology ..... (57)
Medicine and Biology Electrophysiology ..... (57I)
Meteorological Data Collection, Analysis, and Weather Forecasting ..... (55C)
Meteorological Instruments and Instrument Platforms ..... (55D)
Metropolitan Rail Transportation ..... (85C)

Microbiology ..... (57K)
Military Intelligence ..... (74F)
Military Operations, Strategy, and Tactics ..... (74G)
Military Sciences ..... (74)
Mineral Industries ..... (48A)
Minority Enterprises ..... (96E)
Miscellaneous Energy Conversion and Storage ..... (97O)
Miscellaneous Materials ..... (71M)
Missile Guidance and Control Systems ..... (75B)
Missile Launching and Support Systems ..... (75C)
Missile Technology ..... (75)
Missile Tracking Systems ..... (75D)
Missile Trajectories and Reentry Dynamics ..... (75E)
Missile Warheads and Fuses ..... (75F)
Natural Resource Management ..... (48B)
Natural Resource Surveys ..... (48C)
Natural Resources and Earth Sciences ..... (48)
Navigation and Guidance System Components ..... (76C)
Navigation Control Devices and Equipment ..... (76A)
Navigation Guidance Systems ..... (76B)
Navigation Systems ..... (76D)
Navigation, Guidance, and Control ..... (76)
Noise Pollution and Control ..... (68B)
Nondestructive Testing ..... (94J)
Nonferrous Metals and Alloys ..... (71N)
Nuclear Auxiliary Power Systems ..... (77C)
Nuclear Explosion Detection ..... (63E)
Nuclear Explosions and Devices ..... (77D)
Nuclear Instrumentation ..... (77E)
Nuclear Propulsion ..... (81I)
Nuclear Reactor Engineering and Nuclear Power Plants ..... (77H)
Nuclear Reactor Fuels and Fuel Processing ..... (77I)
Nuclear Reactor Materials ..... (77J)
Nuclear Reactor Physics ..... (77K)
Nuclear Science and Technology ..... (77)
Nuclear Technology Selected Studies ..... (97Q)
Nuclear Warfare ..... (74H)
Nutrition ..... (57L)
Occupational Therapy, Physical Therapy, and Rehabilitation ..... (57M)
Ocean Technology and Engineering ..... (47)
Oceanographic Vessels, Instruments, and Platforms ..... (47F)
Operations Research ..... (72E)
Optical Detection ..... (63F)
Optics and Lasers ..... (46C)
Optoelectronic Devices and Systems ..... (49E)
Ordnance ..... (79)
Ordnance - Fire Control and Bombing Systems ..... (79F)
Parachutes and Decelerators ..... (51D)
Parasitology ..... (57N)
Passive Defense Systems ..... (74I)
Pathology ..... (57O)
Pattern Recognition and Image Processing ..... (62F)
Personnel Detection ..... (63G)
Pest Control ..... (57P)
Pesticides Pollution and Control ..... (68E)
Pharmacology and Pharmacological Chemistry ..... (57Q)
Photographic Techniques and Equipment ..... (82B)
Photography and Recording Devices ..... (82)
Physical and Chemical Oceanography ..... (47C)
Physical Meteorology ..... (55E)
Physics ..... (46)
Physiology ..... (57S)
Pipeline Transportation ..... (85E)
Plasma Physics ..... (46G)
Plastics ..... (71O)
Polymer Chemistry ..... (99C)
Power and Signal Transmission Devices ..... (49F)
Problem Solving for State and Local Governments - Finance ..... (43A)
Problem Solving for State and Local Governments-Economic and Community Development ..... (43B)
Problem Solving for State and Local Governments Environment ..... (43F)
Problem Solving Information for State and Local Governments ..... (43)
Productivity ..... (70G)
Prosthetics and Mechanical Organs ..... (95A)
Protective Equipment ..... (95G)
Psychiatry ..... (57T)
Psychology ..... (92B)
Public Administration and Government ..... (70F)
Public Health and Industrial Medicine ..... (57U)
Radiation Pollution and Control ..... (68F)
Radiation Shielding, Protection, and Safety ..... (77F)

Radio and Television Equipment ..... (45B)
Radio Frequency Detection ..... (63H)
Radio Frequency Waves ..... (46H)
Radioactive Wastes and Radioactivity ..... (77G)
Radiobiology ..... (57V)
Railroad Transportation ..... (85I)
Reciprocating and Rotating Combustion Engines ..... (81J)
Recording Devices ..... (82C)
Reference Materials ..... (88E)
Refractory Metals and Alloys ..... (71P)
Research Program Administration and Technology Transfer ..... (70E)
Road Transportation ..... (85H)
Robotics/Robots ..... (41C)
Rocket Engines and Motors ..... (81G)
Rocket Propellants ..... (81H)
Rockets ..... (79H)
Seismic Detection ..... (63I)
Semiconductor Devices ..... (49H)
Snow, Ice, and Permafrost ..... (48H)
Social Concerns ..... (92C)
Soil and Rock Mechanics ..... (50D)
Soil Sciences ..... (48E)
Solar Energy ..... (97N)
Solid State Physics ..... (46D)
Solid Wastes Pollution and Control ..... (68C)
Solvents, Cleaners, and Abrasives ..... (71Q)
Space Extraterrestrial Exploration ..... (84B)
Space Launch Vehicles and Support Equipment ..... (84E)
Space Safety ..... (84F)
Space Technology ..... (84)
Spacecraft Trajectories and Flight Mechanics ..... (84D)
State and Local Governments - Transportation ..... (43G)
State and Local Government Energy ..... (43E)
State and Local Governments - Human Resources ..... (43C)
State and Local Governments Police, Fire, and Emergency Services ..... (43D)
Statistical Analysis ..... (72F)
Stress Physiology ..... (57W)
Structural Mechanics ..... (46E)
Surface-Launched Missiles ..... (75G)
Surgery ..... (57X)
Tissue Preservation and Storage ..... (95B)
Tooling, Machinery, and Tools ..... (94F)
Toxicology ..... (57Y)
Transportation ..... (85)
Transportation Safety ..... (85D)
Tribology ..... (41L)
Underwater Construction and Habitats ..... (47H)
Underwater Ordnance ..... (79I)
Underwater-Launched Missiles ..... (75H)
Unmanned Spacecraft ..... (84G)
Urban Administration and Planning ..... (91G)
Urban and Regional Technology and Development ..... (91)
Urban and Regional Technology Communications ..... (91D)
Urban Economic Studies ..... (91J)
Urban Emergency Services and Planning ..... (91I)
Urban Environmental Management and Planning ..... (91A)
Urban Fire Services, Law Enforcement, and Criminal Justice ..... (91C)
Urban Health Services ..... (91F)
Urban Housing ..... (91E)
Urban Recreation ..... (91L)
Urban Regional Administration and Planning ..... (91H)
Urban Social Services ..... (91K)
Urban Transportation and Traffic Planning ..... (91B)
Water Pollution and Control ..... (68D)
Weather Modification ..... (55F)
Wood and Paper Products ..... (71R)
Zoology ..... (57Z)

NTIS Subject Categories Alphabetical Listing with Scope Descriptions

Appendix C

70-Administration & Management

700-General
Organizational structure and organization theory.

70A-Inventory Control
Inventory analysis; Inventory models; Obsolescence; Repair-replacement tradeoffs; Spare parts; Stock level control; Usage prediction; Warehouse automation; Stockpiling.

70B-Management Practice
Theory and concepts of management including record keeping, planning, scheduling, organization, coordination, decision making, policy making; Productivity management; Cost effectiveness; Systems management; Contact management; Management methods (PERT, PPB, etc.); Management games. Applied studies are classified in the application.

For research management, use 70E.

70C-Management Information Systems
Information systems which include data collection, data processing, and information delivery for use in decision making an evaluation by managers; Manual and automated systems.

See also 88B.

70D-Personnel Management, Labor Relations & Manpower Studies
Selection, recruitment, management, utilization, and evaluation of personnel; Job descriptions; Job analysis; Salary administration; Labor supply; Labor unions; Arbitration and bargaining; Industrial relations; Fringe benefits, and incentives; Manpower allocation requirements and utilization.

For library and information science personnel, use 88D.

For health personnel, use 44P.

* Every primary subject category has a "General" subcategory which contains items whose subject matter falls either into several subcategories or none of the subcategories within a primary category.

In the generic example that follows, the Primary Subject Category is Administration & Management; the Subject Category Code is 70; the Subcategory and Code is 70A; and the descriptions follow. The descriptions are the concepts contained in a report; be careful to avoid "word matching."

70-Administration & Management

70A-Inventory control
Inventory analysis; Inventory models; Obsolescence; Repair-replacement tradeoffs; Spare parts; Stock level control; Usage prediction; Warehouse automation; Stock-piling.

70E-Research Program Administration & Technology Transfer
Research management, development, and forecasting; Research contract management; Research needs; Technology transfer and forecasting. Excludes research methods per se. Studies of specific programs are excluded unless they discuss a program at the national level, technology innovation, or trends and impacts of new technology.

70F-Public Administration & Government
National, state, and local government structure, operation, and administration. Operations of government agencies and their interactions; Intergovernmental relations.

See also 43, 91G, and 91H.

70G-Productivity
Productivity of businesses, government, employees, management, and services; Improving quality of work life; Measurement of productivity efficiency and effectiveness; Employee attitudes and motivation, manpower utilization and performance improvement, job satisfaction, job security; Labor-management cooperation, joint committees participative management, job redesign; Alternative work schedules; Incentive plans. Productivity barriers including regulations, obsolete practices, paperwork, and financing methods.

See also 70B, 70D, 70F, 96A, and 96G.

For specific applications of productivity to manufacturing, use 41D and 94.

51-Aeronautics & Aerodynamics

510-General
Includes landing mats.

51A-Aerodynamics
Aerodynamic characteristics and problems of bodies as they are affected by the dynamics of phenomena relating to boundary layer, lift, drag, laminar and turbulent flow, compressible flow, lift, aerodynamic heating, vortex flow, wake, etc. in aerodynamic regimes. Includes aircraft, ground vehicles, and structures.

See also 46B.

For missile reentry dynamics, use 75E.

For spacecraft reentry dynamics, use 84D.

51B-Aeronautics
Aircraft operations such as takeoff and landing, all-weather and night flight, taxiing, approach, letdown, in-flight refueling, etc. Includes aviation accidents.

51C-Aircraft
Design, production, and maintenance of aircraft, aircraft components and equipment. Structural studies of airframes, bodies, wings, fuselages; Military and commercial aircraft; Balloons (excludes meteorological balloons); Air cushion vehicles (excludes tracked vehicles).

See also 85A and 81D.

For meteorological balloons, use 55D.

For tracked air cushion vehicles, use 85C.

For electronic equipment, use 51E.

51D-Parachutes & Decelerators
Deployable devices and structures to induce drag and deceleration of aircraft, spacecraft, and test vehicles such as rocket sleds.

51E-Avionics
Airborne electronic equipment. Includes electronic equipment used for communications; Navigation; Control systems; Onboard air traffic control; Detection.

See also 45, 49, 63, and 76.

51F-Test Facilities & Equipment
Wind tunnels; Simulators; Flight simulators.

For flight simulators used for training, use 92A.

98-Agriculture & Food

980-General

98A-Agricultural Chemistry
The application of chemistry and chemical analysis to agriculture; Fertilizer production; Soil chemistry; Chemistry of feeding stuffs; Crop chemistry; Biochemical studies.

For food chemistry, use 98H.

98B-Agricultural Economics
Economics conditions, markets, subsidies, and policies affecting agriculture; Farm management and finance; Land and labor economics; Prices and price control.

See also 96C.

98C-Agricultural Equipment, Facilities, & Operations
Agricultural engineering; Agricultural machinery and tools; Seed preservation; Planting, fertilizing, mulching, weeding, and harvesting; Pest and disease control techniques and equipment; Crop protection; Crop drying and storage; Farm water supplies; Irrigation systems; Farm safety; Farm construction and operation.

For pest control, see also 57P.

For food processing, use 98H.

98D-Agronomy, Horticulture, & Plant Pathology
Field crop production; Cultivation of orchards, gardens and nurseries; Plant biology; Plant breeding, propagation, and hybridizing; Hydroponics.

See also 57C.

98E-Animal Husbandry & Veterinary Medicine
Production and care of domestic and wild animals; Breeding, feeding, management, rearing, testing, and training; Pets; Animal pathology; Toxic effects on domestic animals; Animal quarantine; Disease resistance, control and treatment; Breeding, care, and utilization of laboratory animals.

See also 57Z.

98F-Fisheries & Aquaculture
Fishing, fishing equipment, and shipboard processing of fisheries products; Cultivation of fishes, shellfish, and algae in fresh or salt water for commercial or recreational use; Use of fish ladders and weirs; Sport fishing.

See also 47D, 48B, and 57Z.

For fish processing, use 98H.

98G-Agriculture Resource Surveys
Surveys to scan crop yields, soil moisture content, crop diseases, and forest diseases. Includes fishery surveys; Satellite and aerial surveys.

98H-Food Technology
Pasteurizing, curing, canning, dehydrating, freezing, irradiation, freeze drying, etc., of foods and other agricultural products; Sanitation and fumigation of products; Food additives and preservatives; Analysis and inspection of products; Storage, packaging, and display of products; Kitchen and cooking equipment.

For biochemical studies of foods, see also 57B.

54-Astronomy & Astrophysics

540-General

54A-Astrogeology
Studies of the structure and composition of planets and other bodies in the solar system.

For geology and geophysics, see also 48F.

54B-Astronomy & Celestial Mechanics
Positions and motions of the celestial bodies; Ephemerides, Eclipses.

54C-Astrophysics
Physical and chemical aspects of celestial bodies, their origin and evolution. Includes astronomical spectroscopy, radio astronomy, solar structure, and planetary atmospheres.

54D-Cosmic Ray Research
Detection and analysis of cosmic rays.

55-Atmospheric Sciences

550-General

55A-Aeronomy
Physics and chemistry of the upper atmosphere; Composition; Chemical reactions; Aurora; Airglow; Solar-terrestrial relationships.

For cosmic ray research, use 54D.

55B-Dynamic Meteorology
Studies of atmospheric motions; Atmospheric diffusion models; Atmospheric circulation.

For air pollution movement studies, use 68A.

55C-Meteorological Data Collection, Analysis, & Weather Forecasting
Climatology; Satellite meteorology; Weather prediction; Ice forecasting.

55D-Meteorological Instruments & Instrument Platforms
Instruments used to record meteorological parameters; Meteorological balloons; Weather stations; Sounding rockets; Remote sensors.

55E-Physical Meteorology
Acoustical, electrical, optical, and thermodynamic properties of the atmosphere; Cloud physics; Precipitation theory; Global warming.

See also 68A.

55F-Weather Modification
Change of weather conditions through artificial means; Fog dispersal; Artificial precipitation.

92-Behavior & Society

920-General
Includes general overall census studies; Political science.

92A-Job Training & Career Development
Vocational training; On-the-job training; Retraining; Vocational rehabilitation; Use and design of training simulators (including flight simulators) and equipment; Instructional aids; Professional development; Career development.

For curriculum development, use 92D.

92B-Psychology
Human behavior; Personality; Intelligence; Learning ability; Judgement; Motivation; Perception; Job satisfaction; Leadership characteristics; Psychometrics; Adaptability; Social, industrial, group, organizational, interpersonal, and experimental psychology; Clinical psychology; Physiological psychology.

For the measurement of hearing, vision, heart rate, respiration and other physiological responses as related to behavior, use 57T or 57W.

92C-Social Concerns
Sociology and sociometrics; Race relations; Age group and minority group studies; Social rehabilitation of drug abusers, alcoholics, physically, emotionally, and mentally handicapped, offenders, etc.; Cultural and economic deprivation; Social discrimination; Immigration; Demography; Social services, including child care, welfare, counseling, financial assistance, and employment and unemployment services; Attitude studies.

See also 43C, 44, and 91K.

92D-Education, Law, & Humanities
Formal education; School systems; Educational administration; Curricula; Instructional devices and materials, including audiovisual; Teaching methods; Computer-assisted instruction; Laws; Linguistics; Machine translation; Fine arts; Archaeology; History; Anthropology; Humanities; Religion.

92E-International Relations
Political and social indicators; Crises and crisis management; Conflict analysis; Foreign aid; Foreign policy and foreign affairs; International political science; Disarmament and arms control; Espionage; Includes international relationships concerning territorial seas, fishing, extradition, and natural resources.

See also 74H.

For international commerce, use 96C.

95-Biomedical Technology & Human Factors Engineering

950-General

95A-Prosthetics & Mechanical Organs
Includes materials and equipment going into human bodies, enabling them to function properly, either temporarily or permanently. Artificial limbs and limb braces; Facial prosthetics, including artificial eyes; Dental prosthetics; Mechanical organs and mechanical hearts; Circulatory assist devices; Artificial kidneys, etc.; Biocompatible materials including tissue adhesives, tissue compatible materials, and antithrombogenic materials.

For prosthodontics, use 57G.

95B-Tissue Preservation & Storage
Preservation of organs, tissue, and blood for transplantation or transfusion to living organs;
Blood and tissue banks; Properties and evaluation of preserved and stored materials.

See also 57J, 57S, and 57X.

95C-Biomedical Instrumentation & Bioengineering
Includes materials and equipment used to monitor human body functions. Design, use, and performance of biomedical equipment; Biotelemetry including biotelemetry transducer and transmitter equipment; Hospital equipment and supplies; Dental materials and equipment; Equipment for physiological monitoring; Diagnostic equipment; Biomedical laboratory equipment.

See also 95A.

95D-Human Factors Engineering
Design of tools, instruments, equipment, and machinery with emphasis on optimum utilization by humans; Habitability of work and living space; Ergonomics; Interaction of man and equipment in terms of subsystem and system performance requirements and evaluation. Encompasses manual controls, tactical kinesthesis, and other human sensory modalities involved in operation of equipment and understanding of personnel subsystems; Man-machine systems. Includes anthropometric studies, protective equipment, protective clothing, and life support systems.

95E-Life Support Systems
Equipment and techniques for sustaining life in foreign environments, such as space, underground, and underwater; Closed ecological systems (includes pressure suits, diving gear, and breathing apparatus).

See also 95D.

95F-Bionics & Artificial Intelligence
Study of biological processes in order to develop engineering systems; Simulation of biological processes; Comparative studies of control systems formed by the brain and nervous system; Pattern recognition systems based on biological modes; Biological applications of information theory; Cybernetics.

95G-Protective Equipment
Equipment providing protection against such environmental elements as heat, cold, noise, machinery, and radiation.

For equipment and techniques for sustaining life in environments where normal respiration is not possible, use 95E.

89-Building Industry Technology
Includes fires in buildings.

890-General
Includes fires in buildings.

89B-Architectural Design & Environmental Engineering
Architecture; Human engineering; Site surveys; Interior design; Lighting; Heating, ventilating,
and air conditioning; Heat loss studies. Includes environmental engineering equipment.

See also 97J and 94E.

89C-Construction Management & Techniques

Excavation; Fabrication (presite and onsite); Construction techniques; Reconstruction; Management including planning, manpower, and labor studies.

89D-Structural Analyses

Dynamics and statics of structures and structural members including kinetics, kinematics, vibration and stress analyses; Induced environmental stresses including earthquakes, wind, and flood; Foundation stresses; Soil-structure interactions.

89E-Building Standards & Codes

Standards and codes for buildings, equipment, components, and materials.

89G-Construction Materials, Components, & Equipment

Plumbing; Wiring; Insulation; Doors and windows; Walls; Joints; Beams; Construction equipment such as bulldozers and cranes. Includes flammability and fire studies. Cement and concrete.

See also 50C.

For cement properties, see also 71D.

89H-Building Equipment, Furnishings, & Maintenance

Equipment including security alarms (i.e. Burglar alarms), elevators, and fire safety devices; Furnishings, including major household appliances, rugs, and furniture; Maintenance, including repair, pest control, and cleaning.

For environmental engineering equipment, use 89B.

96-Business & Economics

960-General

Includes economic theory; Business and economic census studies; Insurance not covered by another subcategory; Small businesses.

96A-Domestic Commerce, Marketing, & Economics

National and state-level studies; Industrial costs and economics; Economic impact of industries; Economic impacts on industries; Industrial statistics; Agricultural economics; Productivity; Labor supply and demand; Labor costs and economics; Inflation; Economic aspects of unemployment; Employment and unemployment statistics; Wage surveys; United States commerce; Wholesale and retail trade; Domestic market surveys; Business, personal, and property taxes; Income tax data; Franchising.

See also 43B, 70D, 91J, and 98B.

For studies of individual plants or operations, see the field of application; For economic impacts of individual plants or operations, see the field of application; For regional development,
use 43B and 91J.

96C-International Commerce, Marketing, & Economics

Foreign market surveys and research; International trade; Imports and exports; Customs and tariffs; Multinational businesses; Trends and forecasting.

For international finance, use 96F.

96D-Consumer Affairs

Consumer problems and protection; Truth in advertising; Commercial psychology; Product maintenance and reliability problems; Home appliances safety; Product comparison studies; Flammability studies; Motor vehicle recalls.

96E-Minority Enterprises

Minority owned and operated businesses; Business training of minority groups; Franchising; Equal opportunities in business.

96F-Banking & Finance

Investments; Credit; Banks and trust companies; Mortgage finance; Savings and loan associations; Security and commodity brokerage; Balance of payments; Gold and silver movement; Cash flow; Regulations; International finance.

For government financial operations, use 43A, 70F, 91G, and/or 91H.

96G-Foreign Industry Economic Development

Private and governmental industrial and economic development in foreign countries including industrialized and developing countries; International technology transfer; For foreign market surveys and international trade, use 96C.

96H-Foreign Business & Economics

Foreign and developing countries; Businesses, economic conditions and socioeconomics.

For foreign market surveys and international trade, use 96C.

For social concerns related to economics, see also 92C.

99-Chemistry

990-General

99A-Analytical Chemistry

Techniques and instrumentation for the separation and analysis of individual compounds or specific groups or compounds, both inorganic and organic. Includes qualitative, quantitative, volumetric, gravimetric, optical, spectroscopic; electrochemical, ion exchange, chromatographic analysis; Test methods; Forensic chemistry; Data interpretation; Routine analysis or experimental results.

99B-Industrial Chemistry & Chemical Process Engineering

Techniques, processes, unit operations, and plant equipment that apply to chemical manufacturing, processing, transportation, and storage; Petroleum refining; Desalination technology; Pollution control equipment; Process control technology; Process engineering; Chemical reactors.

For coal gasification and liquefaction processes, see also 97F and 97K.

For specific environmental pollution control, see also 68.

For water purification, see also 50B and 68D.

99C-Polymer Chemistry

Synthesis, properties, reactions and theories of polymers and copolymers. Includes all types of polymerization, curing, crosslinking, reaction kinetics, etc.

For mechanical properties of polymers, use 71O and 71H.

99D-Basic & Synthetic Chemistry

Synthesis, properties, and reactions of inorganic and organic compounds; Studies of individual or specific groups of chemical elements; Molecular structure; Stereochemistry.

For chemical reaction mechanisms between atoms, ions, or molecules, see also 99F.

For spectrum analysis of compounds, use 99A and 99F.

99E-Photochemistry & Radiation Chemistry

Studies involving the interrelationships of electromagnetic or particle radiation and chemical reactions;
Studies of radioactive elements and their reactions; Radiochemistry; Photochemical reactions.

See also 55A and 68A.

99F-Physical & Theoretical Chemistry

Physical chemistry; Thermodynamics; Thermochemistry; Colloids and gels; Surface chemistry; Catalysis and catalysts; Electrochemistry; Solutions; Chemical equilibria; Membranes; Reaction kinetics; Quantum mechanics; The mathematical determination of atomic or molecular orbitals, energy levels, or properties; The application of mathematics to chemical systems and electronic spectra, excluding routine analysis or experimental results; Molecular spectra interpretation; Chemical reaction mechanisms in the gas, liquid, or solid phase between atoms, ions, or molecules; Atomic and molecular energy studies; Phase studies of nonmetallic systems; Isotherms; Crystallography.

For advanced materials, use 71Gen or the field of application.

For solid state physics, use 46D.

For thermodynamics, see also 46Gen.

50-Civil Engineering

500-General

50A-Highway Engineering

Construction of roads and highways; Highway and rights-of-way maintenance including weed control; Bridges and bridge systems; Highway paints and markings; Highway and road signs; Beautification; Slope stability and soil subbases.

50B-Civil Engineering

Dredging; Dams; Water purification; Reservoir engineering; Flood control; Sewers; Waterway engineering; Runway construction; Shore protection; Breakwaters; Harbor engineering; Tunneling.

See also 47.

For sewage treatment, use 68D.

For building construction, use 89.

For oil and gas reservoir engineering, use 97 or 48A.

50C-Construction Equipment, Materials, & Supplies

Excavation and earth moving equipment; Hoisting and conveying equipment; Concrete and cement.

See also 89G.

For properties of concrete and cement, see also 71D.

50D-Soil & Rock Mechanics

Physical properties of soil and rock for utilization in engineering; Landslides; Soil stabilization.

For soil sciences, use 48E.

For soil conservation, use 48B.

For geology and geophysics, use 48F.

81-Combustion, Engines, & Propellants

810-General

81A-Combustion & Ignition

Autoignition, ignition, and combustion. Includes flame studies; Combustion products studies; Ignition systems; Combustion chemistry; Flammability studies.

See also 89 and 94H.

81B-Electric & Ion Propulsion

All types of engines deriving power from free ions and electrons. Includes ion, plasma, and arc jet systems; Propulsion by means of solar wind; Laser propulsion.

For electrically propelled surface vehicles, use 85.

81C-Fuel & Propellant Tanks

Design, performance, and testing of fuel and propellant tanks including those for automobiles, petroleum products, and rocket propellants.

81D-Jet & Gas Turbine Engines

Design, performance, and testing of all types of jet and gas turbine engines, their components, engine nozzles. Includes Ramjet, Scramjet, and Turbofan engines, and hydroduct and turbomachinery as well as nonpropulsive turbines.

See also 97L and 51C.

81G-Rocket Engines & Motors

Design, performance, and testing of rocket engines and motors and their components.

81H-Rocket Propellants

Production, handling, stability, and performance of liquid, solid, thixotropic, and exotic propellants. Includes fuels, oxidizers, additives, and binders.

For combustion and ignition, use 81A.

81I-Nuclear Propulsion

Design, performance, and testing of nuclear engines for surface, air, and space propulsion.

See also 85.

81J-Reciprocation & Rotating Combustion Engines

Design, performance, and testing of reciprocating and rotating engines of various configurations for all types of propulsion. Includes internal and external combustion engines; Engine exhaust systems; Engine air systems components; Engine structures; Stirling and diesel engines.

See also 97L and 85H.

45-Communication

450-General

45A-Policies, Regulations, & Studies

Licensing; Legislation; National policies and Federal regulatory controls; Frequency management; Broadcasting standards; Time signals, etc.

45B-Radio & Television Equipment

Design and maintenance of radio and television transmitting and receiving equipment only.

See also 51E.

45C-Common Carrier & Satellite

All communication equipment except radio and television. Optical, radio, microwave, wire, and acoustic communication; Telephone, telemeter, telegraph, television, and radio communication systems; Computer network communications; Digital communication; Intercommunication systems; Optical scanning.

For information systems, see also 88B.

For design and construction of communication satellites, see also 84G.

45D-Sociopolitical
Propaganda; Social communication; Sign language, Effects of communication on society and behavior; Postal service; Mass media communication.

45E-Graphics
Publishing; Printing; Graphic arts; Reprography; Xerography; Facsimile; Desk top publishing.

45F-Verbal
Research and development in vocal communication; Speech intelligibility; Speech recognition.

45G-Communication & Information Theory
Theoretical studies relating to the measurement and transmission of information in a communication channel. Includes coding theory, information capacity, detection of signals in noise.

See also 62E.

62-Computers, Control & Information Theory

620-General
Includes computer security; Artificial intelligence; Signal processing (unapplied).

62A-Computer Hardware
Design and development of computers and peripheral equipment, including analog computers, digital computers, hybrid computers, special purpose computers, minicomputers, microcomputers; Computer accessories, supplies and installation; Logic circuits; Computer architecture; Computer network hardware.

For computer hardware applied to a specific application, see the field of application.

For Very Large Scale Integration (VLSI), use 49H.

62B-Computer Software
Computer programming; Programming languages; Compilers; Data base management systems; Software tools; Software reliability; Computer graphics.

For computer software and database development applied to a specific application, see the field of application.

For CAD/CAM, use 41A and 41B.

62C-Control Systems & Control Theory
Theoretical studies of open-loop and closed-loop control systems; Automatic control systems; Principles including adaptive, continuous, digital, distributed parameter, linear, multivariable, nonlinear, optional, predictive, and proportional; Process controllers.

See also 72Gen.

For control systems applied to a specific application, see the field of application.

62D-Information Processing Standards
Standards for the use of automatic data processing equipment and systems. Includes standards for hardware, software, applications, and data; Federal Information Processing Standards (FIPS).

62E-Information Theory
Theoretical studies relating to the measurement and transmission of information in a communication channel, including coding theory, information capacity, and detection of signals in noise.

See also 45G.

62F-Pattern Recognition & Image Processing
Includes feature extraction; Image enhancement; Image restoration; Scene analysis; Character recognition; Barcoding; Computer vision.

62R-Applications Software

62S-Data Files

63-Detection & Countermeasures

630-General
Automated access control systems.

For industrial security, see also 94Gen.

63A-Acoustic Detection
Techniques and equipment used for the detection and tracking of objects by means of sound waves, including ultrasonic and infrasonic radiation; Sonar.

For acoustic testing, use 94.

For detection techniques applied to chemistry, meteorology, astronomy, oceanography, medicine, and manufacturing, use 99, 55, 54, 47, 57, 41, and 94, respectively.

63B-Electromagnetic & Acoustic Countermeasures
Interception, jamming, antijamming, and deception of acoustic and electromagnetic signals; Techniques to nullify the use of detection, surveillance, guidance, and communication systems; Radar jamming; Chaff; Counter-countermeasures.

See also 74.

63C-Infrared & Ultraviolet Detection
Techniques and equipment for the detection and tracking of objects by infrared and ultraviolet radiation; Infrared night vision devices; Infrared homing.

See also 76B.

For earth resource surveys, use 48C and 98G.

For mapping, use 48I.

For photography, use 82B.

For nondestructive testing, use 94J.

For detection techniques applied to chemistry, meteorology, astronomy, oceanography, medicine, and manufacturing, use 99, 55, 57, 41, and 94, respectively.

63D-Magnetic Detection
Techniques and equipment for the detection of objects by means of magnetic fields.

For geomagnetism, use 48.

63E-Nuclear Explosion Detection
Techniques and equipment for the detection of nuclear explosions at high altitude, underground, and in space. Includes the use of shock waves, earth movement, and measurement of nuclear radiation levels.

See also other applicable subcategories in 63, especially 63I.

63F-Optical Detection
Techniques and equipment for the detection by means of light. Includes the use of binoculars, periscopes, telescopes, and night vision devices for object detection, and smoke particle detectors.

See also 46C.

For detection using only infrared or ultraviolet radiation, use 63C.

For earth resources surveys, use 48C and 98G.

For photography, use 82B.

For detection techniques applied to chemistry, meteorology, astronomy, oceanography, medicine, and manufacturing, use 99, 55, 54, 47, 41, and 94, respectively.

63G-Personnel Detection

Techniques and equipment for the detection of personnel. Includes the use of acoustic, seismic, olfactory, chemical, and optical detectors; Antiintrusion devices; Motion detectors; Security devices.

For military passive defense systems, see also 74I.

63H-Radiofrequency Detection

Techniques and equipment for the detection and tracking by means of radiofrequency waves; Radar; Microwave detection; See also 76.

For mapping, use 48I.

For detection techniques applied to meteorology, astronomy, oceanography, medicine, and manufacturing, use 55, 54, 57, 41, and 94 respectively.

63I-Seismic Detection

Techniques and equipment for the detection of objects by means of seismic waves.

For earthquake detection, use 48F.

For seismic prospecting, use 48A.

49-Electrotechnology

490-General

Includes standards, measurements, and instrumentation not applied to any other subcategories.

49A-Antennas

Antennas; Antenna theory; Antenna radiation patterns; Radomes.

49B-Circuits

Circuit theory; Network analysis; Filters; Oscillators; Logic circuits; Printed circuits; Electronic modules; Commutators; Power supply circuits; Waveform generators; Analog to digital converters; Phase locked systems.

For integrated circuits, use 49H.

49C-Electromechanical Devices

Electric motors; Relays; Mechanical switches; Connectors; Circuit breakers; Electric fuses.

49D-Electron Tubes

All electron tubes except those in 49E.

49E-Optoelectronic Devices & Systems

Display systems; Phototubes; Image tubes; Cathode ray tubes; Electroluminescent panels; Light emitting diodes; Photodiodes; Phototransistors; Magnetooptics; Electrooptics; Optical detectors, including infrared and ultraviolet detectors.

See also 63C and 63F.

For solar cells, see also 97N.

For lasers, use 46C.

49F-Power & Signal Transmission Devices

Transmission lines; Electric wire and cable; Waveguides; Fiber optics transmission lines.

49G-Resistive, Capacitive, & Inductive Components

Resistors; Capacitors; Inductors; Transformers; Electromagnets; Potentiometers; Thermistors; Delay lines; Transducers; Crystal resonators. Includes miscellaneous and basic components.

49H-Semiconductor Devices

Transistors; Semiconductor diodes; Integrated circuits.

For photodiodes, phototransistors, light emitting diodes, and optical detectors, use 49E.

97-Energy

970-General

Includes energy source development.

97A-Reserves

Natural reserves; Fuel stockpiles; Mineral and fossil fuel deposits including coal, uranium, petroleum, natural gas, geothermal, peat, and oil shale; Water power potential; Site studies of wind power potential and solar radiation availability.

For individual mine studies, use 48A.

97B-Energy Use, Supply, & Demand

Electric power and fuel consumption and requirements; Supply and demand; Heat use, supply, and demand.

97E-Electric Power Transmission

Electric power distribution; Electric transmission lines and substations; Electric power pools; Wireless energy transmission.

97F-Fuel Conversion Processes

Methods to convert a fuel to a different chemical form including coal gasification and liquefaction; Upgrading fuels by chemical synthesis.

For petroleum refining, oil shale retorting and refining, use 97K and 99B; For environmental studies, use 97R.

97G-Policies, Regulations & Studies

Energy conservation; Licensing; Legislation; Government policies and regulatory controls; Energy goals; Research needs; Energy management, economics, and financing; Depletion allowances and leasing policies; Rates and energy models; Energy shortages; International issues.

97I-Electric Power Production

Design and operation of electric power plants; Commercial, industrial, and residential electric power production; Site surveys; Large-scale nuclear, hydro, solar, geothermal, and fossil fuel electric power plants; Power plant boilers.

Note: usually restricted to large-scale electric power production.

For small-scale electric power production, use 97N, 97O, or 97P.

For pollution control and environmental impact, use 68 and 97R.

For some nuclear power plant studies, use 77 and 97Q. 97Q should be those that are most pertinent to the use of nuclear technology for energy production.

97J-Heating & Cooling Systems

Design and operation of space heating and cooling systems and equipment; Furnace and boiler studies when related to energy conservation and energy use; Cooling towers; MIUS technology; Total energy systems.

See also 97N.

97K-Fuels

Production, performance, properties, storage, prices, and transportation of all types of solid, liquid, and gaseous fuels; Chemical composition of fuels; Fuel compatibility; Hydrogen production; Refuse derived fuels; Fuel desulfurization; Oil shale retorting; Petroleum refining; Fuel additives; Growing plants for fuels; Bioconversion and biomass plantations.

See also 48D and 97N.

For fuel tanks, use 81C.

For nuclear fuels, use 77I.

For fuel conversion, use 97F.

For rocket fuels, use 81H.

For supply and demand, use 97B.

For oil and gas drilling and recovery, coal mining and other energy related mining studies, use 48A.

97L-Engine Studies (Energy Related)

Operation and design of engines when related to energy conservation and energy use. Covers turbine, rotary, and reciprocating engines.

See also 81.

97M-Batteries & Components

Electrochemical batteries of all types including alkaline cells, dry cells, metal-air batteries, primary cells, reserve batteries, storage batteries, thermal batteries, wet cells; Battery containers, depolarizers, electrodes, electrolytes, separators, and other components and materials; Battery chargers and testers; Battery electrochemistry.

For thermoelectric and thermionic batteries, use 97O.

97N-Solar Energy

Solar collectors, concentrators, and absorbers; Solar cells; Solar cookers, dryers, furnaces, generators; Solar heat engines; Solar heating and cooling systems; Solar power plants; Solar stills; Solar water heaters; Solar heat storage systems; Solar water pumps; Solar sea power plants; Orbital solar power plants; Optical coatings and filters for solar devices; Solar energy policies, use, supply, trends, and economics.

97O-Miscellaneous Energy Conversion & Storage

Fuel cells; Magnetohydrodynamics; Experimental electric generators; Turbogenerators; Heat storage; Compressed air energy storage; Mechanical conversion; Thermoelectric and thermionic conversion; Photovoltaic conversion (excludes solar cells); Wind power; Tidal power; Nuclear fusion power plants.

For commercial, industrial, and residential use of energy conversion and storage devices, use 97I or 97J.

97P-Geothermal Energy

Geothermal exploration and prospecting methods and equipment; Geothermal resources; Geothermal energy conversion; Geology applied to geothermal systems; Drilling; Reservoirs; Extraction; Site selection; Geothermal power plants; Corrosion studies; Materials used in geothermal systems.

97Q-Selected Studies In Nuclear Technology

Reports assigned to this subcategory are selected for their broad interest to users in the nuclear energy field.

For other nuclear energy subcategories, use 77.

97R-Environmental Studies

Air, noise, water, and solid waste pollution and pollution control from energy resource development, fuel production, energy production, and energy use; Environmental impacts of energy production and use.

See also 68.

human body functions. Design, use, and performance of biomedical equipment; Biotelemetry including biotelemetry transducer and transmitter equipment; Hospital equipment and supplies; Dental materials and equipment; Equipment for physiological monitoring; Diagnostic equipment; Biomedical laboratory equipment.

See also 95A.

68-Environmental Pollution & Control

680-General

Any study covering multiple types of pollution. Includes broad pollution studies, such as life-cycle analysis of wastes.

68A-Air Pollution & Control

Air pollution from flue gases, exhaust gases, odors, dust, smog, microorganisms, etc.; Control techniques and equipment; Sampling and analytical techniques, and equipment; Waste gas recovery; Biological and ecological effects; Air pollution chemistry; Acid precipitation; Atmospheric motion; Laws, legislation, and regulations; Public administration; Economics; Land use.

See also 43F, 91A, 57, 85, 81, 99A, 99B, and 97R.

For effects on human health, use 68G.

For pesticides and radioactive contaminants, use 68E and 68F respectively.

68B-Noise Pollution & Control

Pollution in the environment by noise from any source including engine noise, traffic and transportation noise, machinery noise, industrial noise, urban noise, sonic boom; Theory and devices for control; Biological and ecological effects; Noise detection; Building technology; Laws, legislation, and regulations; Public administration; Land use.

See also 41I, 43F, 91A, 46A, 57, 85, 89, 94D, and 97R.

For effects on human health, use 68G.

68C-Solid Wastes Pollution & Control

Pollution by solid wastes including garbage, scrap, junked automobiles, spoil, sludge, containers; Disposal methods such as composts or land application, injection wells, incineration, sanitary landfills; Mining wastes; Processing for separation and materials recovery; Solid waste utilization; Recycling; Biological and ecological effects; Superfund (Records of Decision, etc.); SITE technology; Laws, legislation, and regulations; Public administration; Economics; Land use. Includes disposal of concentrated or pure liquids such as brines, oils, chemicals, and hazardous materials.

See also 43F, 91A, 57, 99B, and 97R.

For effects on human health, use 68G.

For the disposal of pesticides and radioactive contaminants, use 68E and 68F.

For the controlled disposal of radioactive wastes from nuclear reactors, use 77G.

68D-Water Pollution & Control

Pollution by municipal wastes, agricultural wastes, industrial wastes, mine wastes, radioactive contaminants; Chemistry and analysis of pollutants; Thermal pollution; Oil pollution; Control techniques and equipment; Sewage treatment; Industrial waste water pretreatment; Hydrology and limnology; Biological and ecological effects; Waste water reuse; Laws, legislation, and regulations; Public administration; Economics; Land use.

See also 43F, 91A, 47, 48G, 57, 97R, 98, 99A, and 99B.

For effects on human health, use 68G.

For pollution by pesticides and radioactive contaminants, use 68E and 68F respectively.

For the design and construction of sewers, and drinking water treatment, use 50B.

68E-Pesticides Pollution & Control

Pollution by insecticides, herbicides, fungicides, rodenticides; Residues; Decomposition studies; Analysis and detection; Soil chemistry and biology; Adverse biological effects; Ecology; Laws, legislation, and regulations; Public administration; Economics.

See also 57, 68A, 68C, 68D, 43F, 91A, 98, and 99A.

For effects on human health, use 68G.

68F-Radiation Pollution & Control

Involves pollution of the environment by particle and electromagnetic radiation from natural and synthetic sources, including neutrons, X-rays, ultraviolet radiation, microwaves, alpha particles; Radon; Sampling and analytical techniques; Fallout; Biological and ecological effects; Laws, legislation, and regulations; Public administration; Economics.

See also 57, 68A, 68C, 68D, 91A, 97R.

For effects on human health, use 68G.

For the controlled disposal of radioactive wastes from nuclear reactors, use 77G.

68G-Environmental Health & Safety

Effects of pollution on public health and safety; Toxicology; Industrial health; Physiology; Psychology; Clinical medicine; Radiobiology; Animals used as research experimental models.

See also 41I, 57, 44G, 68A, 68B, 68C, 68D, 91A, 43F, 94D, and 97R.

68H-Environmental Impact Statements

Only actual draft and final statements are posted in this subcategory. Environmental impact statements describing national effects are posted here and to other appropriate subcategories.

For studies about environmental impact statements, use 68Gen.

90-Government Inventions for Licensing

For patents and patent applications only (will be labeled as such in the report title); Not for bibliographies.

900-General

Computer software.

90A-Mechanical Devices & Equipment

Devices and equipment for fuel ignition; Heating, illumination, and refrigeration; Cleaning; Printing; Product handling and transportation; Sprinklers; Fire extinguishers; Safety; Motor and other land vehicles; Earthworking and excavating; Tools; Jacks; Hydraulic and pneumatic systems; Power transmissions; Couplings, fasteners, and joints; Piping; Drilling and mining; Separators; Locks; Sewing machines; Winding and reeling; etc.

For metal shaping and forming, use 90E.

For medical equipment, use 90D.

90B-Chemistry

Organic and inorganic compounds; Batteries; Electrochemistry; Hydrocarbons; Lubricating compositions; Propellents and rocket fuels; Acids; Polymers; Plastics; Inks; Bleaching; Dyeing; Fertilizers; Food fermentation; Sugar and starch; Paper making; Textiles; Paints; Coatings (except metal coatings); Chemical reactors; etc.

90C-Nuclear Technology

Reactors; Radioactive materials; Nuclear instrumentation; Nuclear radiation safety; Nuclear power plants and reactor engineering; Nuclear fusion; Particle accelerators; Plasma devices; etc.

90D-Biology & Medicine

Drugs; Cosmetics; Prosthetics; Medical equipment; Pesticide biology; Biological laboratory equipment; Life support equipment.

90E-Metallurgy

Metal stock; Metal coatings; Molding, shaping, and treating processes; Laminating; Glasses; Material shaping; Sheet metal and wire working; Bonding and joining; Cutlery; etc.

For use of mechanical equipment, use 90A.

90F-Electrotechnology

Antennas, circuits, and electromechanical devices; Electron tubes; Optoelectronic devices; Power and signal transmission devices; Resistive, capacitive and inductive components; Semiconductor devices; Information transmission, storage, and retrieval; Communications; etc.

90G-Instruments

Photographic equipment; Measuring and testing instruments and equipments; Acoustic devices; Etc.

For nuclear instruments, use 90C.

90H-Optics & Lasers

Optical materials, components, equipment, and systems; Infrared, visible, ultraviolet, and X-ray lasers; Masers.

90I-Ordnance

Production and performance of projectiles, fuzes, explosive materials, pyrotechnics, and weapon systems (not limited to military applications); Ordnance storage systems; Fire control systems; Weapons delivery systems; Missiles, rockets, and propellants directly related thereto; Weapons carriers (tanks, aircraft ships, etc); Guns; Laser weapons; Bombs.

90J-Food Technology

Pasteurizing, curing, canning, dehydrating, freezing, irradiation, freeze drying, etc., of foods and other agricultural products; Sanitation and fumigation of products; Food additives and preservatives; Analysis and inspection of products; Storage, packaging, and display of products; Cooking devices.

For food fermentation, use 90B.

44-Health Care

440-General

44A-Planning Methodology

Health planning theory including methods, tactics, techniques and policies; Evaluation of planning theories and processes.

44B-Agency Administrative & Financial Management

Management practices and policies regarding technical assistance, evaluation of health care agency activities, public relations; Financial management and accounting methods.

44C-Community & Population Characteristics

Data and numerical information including health status, quality of care, malpractice, health care needs/demands; Health care utilization, health care cost, vital statistics; Demographic information, economic, environmental, nutritional, and societal factors affecting health, and health resource distribution.

44D-Health Care Assessment & Quality Assurance

Financial feasibility review, economic impact review, and project review; Certificate of need theory; Health manpower education institutional accreditation; Judicatory procedures, review, and assessment; Quality assurance theory; Certificatory methodology; Health manpower proficiency testing, and public health education evaluation; Classification of health care facilities and health care personnel.

44E-Health Care Measurement Methodology

Measurement of health status, quality of care, health facility supply, health manpower supply, proficiency and productivity, and health care costs; Health care needs/demands and utilization measurement.

See also 44L, 44N, and 44Q.

44F-Health Care Forecasting Methodology

Projecting health care needs/demands and health care utilization; Health care facility supply; Health manpower supply; Health care costs; Home health care; Cross-impact projections.

44G-Environmental & Occupational Factors

Environmental factors affecting health including housing, sanitation, water pollution, solid waste pollution, noise pollution, disease vectors, safety hazards, and occupational and industrial hazards; Overpopulation; Health facility environmental considerations and environmental impact; Energy sources in the health field.

See also 57U and 68G.

44H-Health Care Technology

Descriptions and applications of new health care technology and equipment; Ailment prevention techniques, and technology regarding diagnosis, therapy, rehabilitation, and food and nutrition; Health care equipment and facility design and performance considerations.

See also 57 and 95.

44J-Health Delivery Plans, Projects & Studies

Plans, projects, and studies related to the institutional delivery of health services including state/local health plans, state/local medical facility plans, plans for specific health services, and health delivery feasibility studies.

44K-Health Services

Personal and public health services, patient care, and maintenance of an individual's health status including hospital services acute in-patient services, long-term inpatient services, nursing home services, emergency services, public health services, mental services, nursing services, dental services, and medically-related social services including institution discharge services.

44L-Health Care Needs & Demands

Measurement of health care needs/demands, hospital care, acute in-patient care, long-term in patient care, nursing home care, medical care, mental care, nursing care, dental care, and health insurance; Home health care; Measurements of health manpower requirements/demands.

See also 44E.

44M-Health Resources

Surveys, reports, and studies related to specific health care resources including manpower, facilities, sources of financing, and government and private health-related organizations, agencies and individuals.

44N-Health Care Utilization

Measurements regarding utilization of health resources including manpower, ambulatory care, emergency care, public health care, medical care, mental care, nursing care, dental care, health insurance, health care facilities, and home health care.

See also 44E and 44L.

44P-Health Education & Manpower Training

Health manpower education including curricula and costs; Health manpower education facility needs/demands; Institutional financing; Financing for health related educational institutions; Student recruiting and retention methods; Continuing education; Career guidance and career advancement; Consumer health education and public health education methods.

44Q-Health-Related Costs

Health care costs, indexes, projections, in-patient care costs, acute in-patient care costs, long-term care costs, nursing home care costs, ambulatory care costs, emergency care costs, public health care costs, medical care costs; Insurance costs; Manpower income; Equipment costs; Facility utilization and construction costs; Ailment costs including preventive medicine costs and injury costs; Transportation costs including emergency transportation costs.

44R-Economics & Sociology

Discussions of economic and sociological factors and theories relevant to health care.

44S-Legislation & Regulations

Laws, bills, regulations, and model legislation. Includes certificate of need, health insurance certification, health manpower licensing, health facility licensing, health manpower employment, and support regarding health manpower education.

44T-Data & Information Systems

Techniques regarding information systems including document sources, acquisition, surrogation, and storage; Information retrieval; Data systems, Data gathering; Data processing; Data processing hardware; Information system feasibility studies, and confidentiality of information.

44U-Health Care Delivery Organization & Administration

Hospital and medical practice administration and management; Organizational structure of health services; Management policies and practices regarding personnel, community participation and relations, and coordination with other agencies; Financial management and accounting methods; Financing of health delivery and facilities; Reporting methods and requirements.

94-Industrial & Mechanical Engineering

940-General

Includes bearings; Mechanical elements; Pipes; Tubes; Levers; Cams; Springs; Mechanical joints; Containers and packing materials; Refrigeration systems and equipment; Industrial furnaces and boilers; Heat exchangers; Heat pumps; Heat pipes; Industrial security; Metrology.

For rocket engine components, use 81G; For fuel tanks, use 81C; For cooling towers, use 97J; For nuclear security, use 77Gen.

94A-Production Planning & Process Controls

Materials control; Numerical control and automation; Time and motion studies ; Scheduling; Production controls and programming; Modeling techniques and program controls; Inventory management.

See also 44A, 41A and 41B.

94B-Quality Control & Reliability

Tolerances allocations; Maintainability requirements; Probability of satisfactory performance of components and equipment; Inspection methods; Destructive industrial testing; Reliability theory; Quality assurance.

See also 41E and 41G.

94C-Plant Design & Maintenance

Site selection; Plant design; Layout; Maintenance management; Scheduled, routine, and corrective maintenance.

See also 41H.

94D-Job Environment

Industrial hygiene and occupational diseases and injuries in settings such as factories, and office and commercial buildings; Industrial psychology; Industrial sociology; Workplace layout and design; Worker interactions.

See also 44G, 57U, 41I, and 92B.

For industrial safety engineering and accident prevention, use 94H.

94E-Environmental Engineering

Lighting; Heating; Ventilating; Air conditioning. Includes environmental engineering equipment related to industrial use. Excludes pollution control.

See also 41I, 89B and 97J.

94F-Tooling, Machinery, & Tools

Machine subassemblies; Robots; Robotics; Tools; Machinery, including hoists, conveyors and pumps.

See also 41C and 41J.

94G-Manufacturing Processes & Materials Handling

Fabrication, assembling, cleaning, and finishing; Industrial and manufacturing processes (limited to in-depth studies that directly discuss specific processes); Bonding and joining, including gluing, welding, soldering, and brazing; Materials forming and machining; Heat treatment; Coating processes; Materials handling, including palletizing, conveying, warehousing, storing, containerization, and packaging.

See also 71, 41B, 41E, and 41F.

For processing and packaging of food, use 98H.

For production of materials, use 71.

For chemical engineering and processing, use 99B.

For the beneficiation and processing of minerals, use 48A.

94H-Industrial Safety Engineering

Accident prevention; Safety measures; Fire prevention; Warning systems; Safety equipment, structures, and clothing.

For industrial safety engineering applied to a specific application, use the field of application.

94I-Hydraulic & Pneumatic Equipment

Design, production, performance, and testing of hydraulic and pneumatic systems, accumulators, actuators, compressors, and distribution equipment; Fluidic and flueric devices.

See also 41J.

For hydraulic fluids, see 71K.

94J-Nondestructive Testing

Nondestructive testing having industrial application; Ultrasonic, radiographic, hydrostatic, magnetic, and optical nondestructive techniques and equipment; Nondestructive testing of flaws, thickness, opacity, strength.

For destructive industrial testing, use 94B.

94K-Laboratory & Test Facility Design & Operation

Measuring, testing, and simulation devices. Includes laboratories, test facilities, and test equipment measuring testing and simulation. If the test facility, equipment, etc. is applied to a specific application, use the field of application.

88-Library & Information Sciences

880-General

Includes general studies about microforms; Film readers; Copyrights; Privacy Act; Report writing.

88A-Operations & Planning

Acquisitions, classification, cataloging, abstracting, and indexing; Circulation and reference systems; Information services; Interlibrary loans; Distribution; Manual and computerized information retrieval; Individual libraries and information center.

For library or information networks, use 88B.

88B-Information Systems

Library and information networks; Operations and planning of these systems; File maintenance and management; Database management; Information superhighway, National Information Infrastructure; Applied information systems (Management, medical, transportation, etc.) See also 44T, 62, and 70C.

For database management, use 62B.

For communications and computer networks, use 45C.

For geographic information systems, see 48I.

88C-Marketing & User Services

User needs, surveys; Promotions; Fees.

88D-Personnel

Training and education; Selection; Management; Performance; Schools and accreditation.

See also 70D.

88E-Reference Materials

Bibliographies; Directories; Glossaries; Catalogs; Thesauri; Indexes; Abstract and title periodicals.

41-Manufacturing Technology

410-General

Includes mechanical elements; Pipes; Tubes; Levers; Cams; Springs; Clutches; Gears; Valves; Filters; Containers and packing materials; Refrigeration systems and equipment; Industrial furnaces and boilers; Heat exchangers; Heat pumps; Heat pipes; Energy management, economics, and financing; International issues.

See also 94O and 97G.

For engine components, use 81.

For fuel tanks, use 81C.

For cooling towers, use 97J.

41A-Computer Aided Design (CAD)

Application of computer hardware and software (programs) to enhance the design, computations, simulation, analysis and modeling, presentations, graphics, drafting, data base creation and human-machine interface, associated with the creation of engineering design specifications.

See also 94A.

41B-Computer Aided Manufacturing (CAM)

Application of computer hardware and software (programs) to enhance materials planning, processing and handling, tooling; Assembly; Quality and reliability control; Inspection; Tests; Scheduling and control; Facilities and equipment maintenance; Group technology applications; Inventory control (raw material, in process and finished); Numerical controls and automation; The creation of Direct Numerical Control (DNC) and Computer Numerical Control (CNC) manufacturing cells and systems.

See also 94A and 94G.

41C-Robotics/Robots

Application of computer hardware and software, controls, sensors, electromechanical and hydro-mechanical devices, to the creation of robots and the application of robots to all facets of manufacturing. Study of biological processes in order to develop engineering systems; Pattern recognition systems based on biological models. Includes feature extraction; Image enhancement; Image restoration; Scene analysis; Character recognition.

See also 95F and 62F.

41D-Productivity

Productivity of employees, management, and services; Improving quality of worklife; Measurement of productivity efficiency and effectiveness; Employee attitudes and motivation; Manpower utilization and performance improvement, job satisfaction, job security; Labor-management, job redesign; Alternative work schedules; Incentive plans; Productivity barriers including regulation, obsolete practices; Paperwork, and financing methods.

See also 70G and 70D.

41E-Manufacturing, Planning, Processing & Control

Fabrication, assembling, cleaning, and finishing; Industrial and manufacturing processes (limited to in-depth studies that directly discuss specific processes); Materials forming and machining; Heat treatment; Fabrication and manufacturing; Layout; Coating processes; Materials handling and control, including palletizing, conveying, warehousing, storing, containerization, and packaging; Time and motion studies; Scheduling; Production controls and programming; Modeling techniques and program controls; Inventory management.

See also 94A.

For the beneficiation and processing of minerals, use 48A.

For chemical engineering and processing, use 99B.

For computer-aided manufacturing, use 41B and 94G.

For lasers used in manufacturing, use 41M.

For processing and packaging of food, use 98H.

For production of materials, use 71.

41F-Joining

Bonding and joining including gluing, welding, soldering, brazing, and fastening; Joints and fasteners; Physical, mechanical, and structural properties of adhesives, sealants, glue, binders, seals, and gaskets.

See also 94G, 94Gen, and 71B.

41G-Quality Control & Reliability

Tolerance allocation; Maintainability requirements; Probability of satisfactory performance of components and equipment; Inspection methods; Reliability theory; Quality assurance; Nondestructive testing having industrial application; Ultrasonic, radiographic, hydrostatic, magnetic, and optical nondestructive techniques and equipment; Nondestructive testing of flaws, thickness, opacity, strength; Destructive industrial testing; Metrology.

See also 94B, 94J, and 94Gen.

41H-Plant Design & Maintenance

Site selection; Plant design; Maintenance Management; Scheduled, routine, and corrective maintenance; Security.

See also 94C.

41I-Job Environment

Industrial hygiene and occupational safety and health. See also 57U, 68G, and 44G. Workplace layout and design; Human factors engineering; Includes Industrial psychology and Industrial sociology; Worker interactions.

See also 94D and 95D.

Includes environmental engineering equipment related to industrial use. See also 97J, 89B, and 94E.

For mine safety, use 48A.

For ordnance safety, use 79A.

For nuclear radiation safety, use 77.

For transportation safety, use 85D.

41J-Tooling, Machinery, & Tools

Machine subassemblies; Tools; Machinery including hoists, conveyors, and pumps; Design, production performance, and testing of hydraulic and pneumatic systems, accumulators, actuators, compressors and distribution equipment; Fluidic and flueric devices; Ergonomics interaction of man and equipment in terms of subsystem and system performance requirements and evaluation; Man-machine systems and human factors engineering.

See also 94F, 94I, 94D, and 95D.

For hydraulic fluids, use 71K.

41K-Engineering Materials

Performance; Properties, fabrication and manufacturing methods of ceramics, coatings and composite materials including ceramic coatings, ceramic fibers, corrosion resistant coatings, reinforced plastics, graphite or carbon composites, laminates; Metal matrix composites, and fiber and particulate composites.

See also 71B, 71D, and 71F.

41L-Tribology

Friction, lubrication and wear, including bearings; Unwanted chemical reaction effects on metals, corrosion of metals and corrosion resistant coatings; Lubricants.

See also 71L, 71G, and 71K.

41M-Optics & Lasers

Design and performance of optical equipment for use in manufacturing applications. Includes laser applications such as laser annealing, cutting, drilling, and welding.

See also 46C.

41N-Computer Software

Computer programming; Programming languages; Compilers; Data base management systems; CAD/CAM robotics.

See also 62B.

41O-Domestic Commerce, Marketing, & Economics

Economic impacts on industries; Productivity; Wage surveys; Domestic market surveys.

See also 96A.

41P-Research Program Administration & Technology Transfer

Research needs; Technology transfer and forecasting.

See also 70E.

71-Materials Sciences

710-General

Advanced materials.

See also 41K.

71A-Ablative Materials & Ablation

Physical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Ablation processes and chemistry; Reentry vehicle heat shields.

For production planning, use 41 and 94.

71B-Adhesives & Sealants

Adhesives; Glues; Binders; Sealants; Seals; Gaskets; Physical, mechanical, and structural properties; Performance; Fabrication and manufacturing; Equipment directly related to processing.

See also 71L and 94G.

For concrete cements, use 50C and 89G.

For propellant binders, use 79A and 81H.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71C-Carbon & Graphite

Carbon and graphite fibers and textiles; Charcoal; Carbon black; Carbon and graphite coatings; Industrial diamonds; Physical, mechanical, and structural properties; Performance, fabrication and manufacturing methods; Equipment directly related to processing.

See also 71A, 71E, 71F, 71I, 71L, and 94G.

For carbon and graphite composites, use 71F.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71D-Ceramics, Refractories, & Glass

Glasses; Brick; Porcelain; Ceramic coatings; Ceramic fibers; Physical, mechanical, and structural properties; Performance; Fabrication and manufacturing; Equipment directly related to processing; Studies of individual structural members; Cement properties.

See also 71E, 71I, 71L, and 94G.

For concrete and cement used as building materials, use 50C and 89G.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71E-Coatings, Colorants, & Finishes

Paints and primers; Varnishes; Corrosion resistant coatings; Coating pigments; Carbon, ceramic, plastic, rubber and metal coatings; Physical, mechanical and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Electroplating; Electrodeposition; Flame and plasma spraying; Vapor deposition.

See also 71G, 71L, and 94G.

For surface treatment not involved with coatings, use 94G.

For dielectric and semiconducting films, use 46 and 49.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71F-Composite Materials

Materials composed of two or more physically distinct constituents; Reinforced plastics, graphite or carbon composites; Laminates; Metal matrix composites; Fiber and particulate composites; Physical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 71L and 94G.

For wood composites, use 71R.

For concrete and reinforced concrete, use 50C and 89G.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71G-Corrosion & Corrosion Inhibition

Unwanted chemical reaction effects on metals; Corrosion of metals; Rusting; Corrosion inhibitors; Corrosion resistant coatings; Corrosion electrochemistry.

See also 71E and 71L.

For concrete corrosion, use 50C and 89G.

71H-Elastomers

Rubbers; Additives; Curing agents; Elastomer polymerization; Physical, chemical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 71E, 71I, 71L, 94G, and 99C.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71I-Fibers & Textiles

Glass, carbon, ceramic, metal, and polymeric fibers; Threads, yarns, textile, and fiber finishing, including dyeing and sizing; Physical, chemical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members; Flame resistance.

See also 71L and 94G.

For fiber composites, use 71F.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71J-Iron & Iron Alloys

Includes steels or alloys containing more than 50% iron. Coatings; Fibers; Extractive metallurgy; Refining; Embrittlement; Physical, mechanical, and structural properties; Microstructure; Phase studies; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 71E, 71I, and 71L.

For corrosion, use 71G.

For beneficiation, use 48A.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71K-Lubricants & Hydraulic Fluids

Solid and liquid lubricants; Additives; Greases; Drilling fluids; Brake fluids; Physical, chemical, mechanical and structural properties; Performance; Manufacturing; Equipment directly related to processing; Chemical synthesis.

See also 71L and 41L.

For pollution studies, use 68. For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71L-Materials Degradation & Fouling

Aging; Erosion and cavitation erosion; Wear; Weathering; Decay; Effects of radiation on materials; Biodeterioration, including fungus deterioration.

See also 71C, 71D, 71F, 71H, 71I, 71J, 71K, 71N, and 71R.

For nuclear reactor materials degradation, see also 77I or 77J. If concerned with nuclear propulsion, use 81I.

71M-Miscellaneous Materials

Materials not included in another group, including leather, fur, refrigerants, and waxes; Physical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 94G.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71N-Nonferrous Metals & Alloys

Includes studies not specifying the type of metal. Coatings; Fibers; Extractive metallurgy; Refining; Embrittlement; Physical, mechanical, and structural properties; Microstructure; Phase studies; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; studies of individual structural members.

See also 71E, 71I, and 71L.

For metal fabrication, use 94G.

For corrosion, use 71G.

For beneficiation, use 48A.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71O-Plastics

Additives; Curing agents; Plastic coatings; Plastic polymerization; Physical, chemical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 71E, 71L, 94G, and 99C.

For plastic composites, use 71F.

For polymeric fibers, use 71I.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71P-Refractory Metals & Alloys

Includes only the following metals and alloys having more than 50% of these metals: iridium, molybdenum, niobium (columbium), osmium, rhenium, tantalum, and tungsten. Coatings; Fibers; Extractive metallurgy; Refining; Embrittlement; Physical, mechanical, and structural properties; Microstructure; Phase studies; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 71E, 71I, and 71L.

For metal fabrication, use 94G.

For corrosion, use 71G.

For beneficiation, use 48A.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71Q-Solvents, Cleaners, & Abrasives

Cleaning compositions; Solvents; Detergents; Soaps and abrasives; Cleaning action of these materials; Physical and chemical properties; Performance; Manufacturing; Equipment directly related to processing.

For cleaning techniques, use 94G.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71R-Wood & Paper Products

Sawing and milling; Lumbering; Plywood, particle and fiber board; Wood product fabrication; Pulping, papermaking, and conversion processes; Physical, chemical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 94G.

For forestry and tree production, use 48D.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

72-Mathematical Sciences

720-General

72B-Algebra, Analysis, Geometry, & Mathematical Logic

Algebra and number theory, including field theory (algebra), group theory, ring theory; Analysis, including calculus of variations, complex variables, differential equations, Fourier analysis, functional analysis, functions (mathematics), measure, and integration; Geometry, tensor analysis, and topology; Mathematical logic, including foundations of mathematics, lattices (mathematics), metamathematics, and set theory.

For applications of mathematics, see the appropriate category of application.

72E-Operations Research

Game theory; Queueing theory; Management games; Mathematical models; Mathematical programming, Network flows; Search theory.

See also Managerial practice, 70B.

For operations research applied to a specific application, see the field of application.

72F-Statistical Analysis

Analysis of variance; Correlations techniques; Discriminate analysis; Distribution theory; Experimental design; Factor analysis; Nonparametric statistics; Probability theory; Regression analysis; Statistical decision theory; Statistical inference; Statistical tests; Stochastic processes.

For statistical analysis applied to a specific application, see the field of application.

57-Medicine & Biology

570-General

57A-Anatomy

Descriptive and comparative anatomy of humans; Anthropometry; Dissection; Neuroanatomy; Morphology.

For plant anatomy, use 57C.

For animal anatomy, use 57Z.

57B-Biochemistry

Studies of the chemical processes which take place in biological systems. Identification and measurement of biochemical substances and methods of analysis, including assaying.

See also 57F, 57L, 57Q, and 99A.

For measurement of biochemical substances for clinical diagnoses, use 57D.

57C-Botany

Study of macroscopic and microscopic plants; Plant anatomy, physiology, pathology, and taxonomy; Phytotoxicity; Includes algae and diatoms.

See also 57H, 57K, 57Y, and 98D.

57D-Clinical Chemistry

Techniques and instrumentation for chemical analysis of body fluids, including blood, and tissues for clinical diagnoses.

See also 99A.

57E-Clinical Medicine

Prevention, diagnosis, and therapy of diseases; Nuclear medicine; Experimental medicine; Clinical protocols.

See also 57J, 57O, and 57X.

For veterinary medicine, use 98E.

For health care services, use 44.

For epidemiology and disease control, use 57U.

57F-Cytology, Genetics, & Molecular Biology

Origin, structure, and functions of living cells and cell components; Hereditary diseases; Use of chemistry and physics to study biological phenomena on the molecular level; Structure and function of biological macromolecules, e.g. proteins and nucleic acids.

See also 57B.

57G-Dentistry

Prevention, diagnosis, and treatment of diseases of the teeth, oral cavity, and associated parts; Oral hygiene.

For dental materials and equipment, use 95C.

For dental prosthetics, use 95A.

For dental services, use 44.

57H-Ecology

Interrelationships of organisms and their environment; Animal, plant, and human ecology; Marine, fresh water, and terrestrial ecology; Ecosystems; Adaptation; Acclimatization; Natural selection; Species diversity; Food chains; Energy balance; Ecological succession; Effects of polluted environments on organisms; Biological productivity.

See also 47D, 48B, 48G, 57C, 57Y, 57Z, 68, 98D, and 98B.

For effects of extreme environments or stimuli on humans, use 57W.

For the interrelationships of humans and their social environments, use 92.

For the effects of industrial environments on humans, use 57U.

57I-Electrophysiology

Electrical activity associated with living organisms and life processes; Electrophysiologic recording including electrocardiography, electroencephalography, and electromyography; Neural transmission; Intracellular potential; Bioelectricity; Bioluminescence; Responses of organisms to electrical stimulation.

57J-Immunology

Mechanisms of immune responses; Antigens and antibodies; Vaccines; Immune serums; Immunization; Immunopathology; Immunohematology; Immunochemistry; Serology; Immunity; Allergy; Histocompatibility; Autoimmune diseases. HIV/AIDS.

See also 57E and 57K.

57K-Microbiology

Studies of microscopic plants and animals; Vaccine and interferon production; Microbial metabolism and biochemistry.

For diagnosis and therapy of infectious diseases, use 57E.

For disease control and epidemiology, use 57U.

For biotechnology applications, see also field of application.

57L-Nutrition

Processes by which humans assimilate and utilize food substances; Experimental nutrition; Nutritive value of foods; Malnutrition; Diet; Food habits; Nutrition surveys; Nutritional requirements; Clinical nutrition.

For food processing, use 98H.

For animal nutrition related to animal husbandry, veterinary medicine or zoology, use 98E or 57Z.

57M-Occupational Therapy, Physical Therapy, & Rehabilitation

Restoration of normal form and function after injury or physical illness; Occupational therapy; Physical therapy; Vocational rehabilitation.

See also 44K, 92A, 95A.

For mental rehabilitation, use 57T.

For social rehabilitation, use 92C and 91K.

For rehabilitation centers, use 44K.

57N-Parasitology

Parasites and parasitism; Host-parasite interactions; Vectors of parasites; Parasitic diseases; Life cycles of parasites.

See also 57H, 57K, and 57P.

57O-Pathology

Studies of the structural and functional changes in tissues and organs which cause or are caused by diseases, trauma or injuries; Gross pathology; Histopathology; Cytopathology; Pathophysiology; Ccmparative and experimental pathology; Histological techniques; Autopsy.

For plant diseases, use 98D.

For animal diseases, use 98E.

For diagnosis and treatment of diseases, use 57E.

For immunopathology, use 57J.

57P-Pest Control

Agents and methods for the control of plant and animal pests; Pesticides, algicides, herbicides, insecticides, molluscacides, fungicides, rodenticides, etc.; Repellants and attractants; Fumigation and extermination; Traps; Biological pest control.

See also 68E and 98C.

For ecological aspects of pest control, use 57H.

57Q-Pharmacology & Pharmacological Chemistry

Synthesis, composition, properties, and effects of drugs; Pharmacy, Pharmacodynamics.

See also 57Y.

For social effects of drugs, use 91C and 92C.

For radiopharmaceuticals, use 57V.

For business studies of the drug industry, use 96A.

57S-Physiology

Functions of the human organism and its parts and comparative physiology; Metabolism; Endocrinology; Neurophysiology; Respiration; Biological rhythms; Growth; Aging; Regeneration.

See also 57B, 57F, 57J, and 57L.

For plant physiology, use 57C.

For animal physiology, use 57Z and 98E.

For psychophysiology, use 57T and 92B.

For electrophysiology, use 57I.

For pathophysiology, use 57O.

For stress physiology, use 57W.

57T-Psychiatry

Prevention, diagnosis, and treatment of mental, emotional, and behavioral disorders; Psychopathology; Psychoanalysis; Neuropsychiatry; Orthopsychiatry; Psychotherapy; Psychophysiology; Psychophysics.

For psychological mechanisms and processes, use 92B.

57U-Public Health & Industrial Medicine

Protection and improvement of community health; Effects of environments on public health; School and public health programs, services, and education; Health screening; Health statistics; Epidemiology; Toxic and infectious disease control; Preventive medicine; Hygiene and sanitation; Drinking water quality; Industrial hygiene and medicine; Safety engineering; Occupational safety and health; Industrial safety and detection equipment; Site-specific investigations.

See also 94D, 94H, 41I and 68G.

For occupational and For occupational and environmental factors related to health planning,
use 44G.

57V-Radiobiology

Biological effects of radiation; Dosimetry; Health physics; Radiation sickness and injury; Radiation hazards; Radiation protection; Radiopharmaceuticals. Includes electromagnetic, ultrasonic, and particle radiation.

See also 68F and 99E.

For radioecology, use 57H.

For nuclear medicine, radiology, and radiotherapy, use 57E.

57W-Stress Physiology

Effects of extreme environments or stimuli on human biological processes; Physiological effects of motion, gravity, sound, temperature, electromagnetic, fields, pressure, sensory deprivation, and fatigue; Acclimatization. Includes aerospace and underwater medicine.

See also 51B, 57H, and 84.

For plants, use 57C.

For animals, use 57Z.

For stress psychology, use 92B or 57T.

57X-Surgery

Treatment of diseases, injuries, and deformities by manual or operative methods; Organ and tissue transplantation; Pre-and post-management of surgical patients; Experimental surgery.

See also 95A and 95B.

For dental surgery, use 57G.

For histocompatibility, use 57J.

57Y-Toxicology

Study of the adverse effects of substances on biological systems and the diagnosis and treatment of toxic diseases; Toxicity studies; Risk assessment of chemicals; Antidotes.

See also 57C, 57Q, 57S and 57Z.

57Z-Zoology

Animal anatomy and physiology; Natural history; Animal behavior; Taxonomy.

See also 47D, 48B, 57Y, and 98F.

For animal models used in biomedical research, use the research discipline.

For laboratory and domesticated animal care, or animal diseases, use 98E.

74-Military Sciences

740-General

74A-Antiaircraft Defense Systems

Tactical and terminal countermeasures against attacking aircraft that includes tracking and computing equipment, antiaircraft guns, rockets, and missiles.

For specific missiles and rockets, use 75.

74B-Antimissile Defense Systems

Point and terminal defense and countermeasures against air-, surface-, or underwater-launched missiles, bombardment satellites. Includes land based and shipborne tracking and computing systems; Strategic Defense Initiatives (SDI), Star Wars; ballistic missile defense.

74C-Antisubmarine Warfare

Operations conducted against submarines, their supporting forces and operating bases. Include air, surface, and underwater operations.

See also 63.

74D-Chemical, Biological, & Radiological Warfare

Design, development, and utilization of chemical, biological, and radiological weapons; Production, generation, and stability of lethal and nonlethal agents; Biological agents including anticrop and defoliating agents.

For nuclear weapons, use 74H.

74E-Logistics, Military Facilities, & Supplies

Procurement, storage, distribution, issue, repair, replacement of military equipment; Deployment of troops and cargo; Industrial mobilization; stock level controls and inventory techniques; Defense conversion; Downsizing; Base closures; Force reduction; Dual Use Technology; Continuous Acquisition and Life-cycle Support (CALS), formerly Computer Aided Acquisition and Logistics Support.

For related civilian studies, use 70 and 94.

74F-Military Intelligence

Techniques for collecting, evaluating, and disseminating information concerning foreign nations. Includes damage assessment; Surveillance and reconnaissance systems.

74G-Military Operations, Strategy, & Tactics

Joint and combined operations, campaigns, battles, invasions, theater operations; Planning analysis, appraisal, and threat evaluation; Methods of attack and support; Armed Forces maneuvers; Limited and unconventional warfare; Sabotage, insurgency, and counterinsurgency; Guerrilla warfare; Psychological and cold warfare.

74H-Nuclear Warfare

Design, development, and applications of nuclear weapons and devices; Studies of the physical effects of nuclear weapons; Arms control.

For nuclear guided missile warheads, use 75F.

74I-Passive Defense Systems

Systems, structures, and devices to provide area monitoring security and denial. Includes camouflage, barbed wire, minefields, warning systems, barriers, and other anti-intrusion devices.

For civil defense, see also 91I.

For personnel detection, see also 63G.

75-Missile Technology

750-General

75A-Air & Space-Launched Missiles

Design, construction and performance of missiles launched from aircraft or spacecraft.

75B-Missile Guidance & Control Systems

Techniques for guidance and control of missiles from launching to impact. Includes optical guidance, television guidance, wire guidance, preset and terminal guidance, inertial guidance, command guidance, and homing guidance.

75C-Missile Launching & Support Systems

Missile handling and launching. Includes transportation, storage, and preparation for launching; Air, space, surface, and underwater launching and support equipment and techniques; Checkout equipment and procedures; Guided missile ranges.

75D-Missile Tracking Systems

Techniques and systems for tracking missiles as defensive measures. Can be from surface installations or air and spaceborne platforms.

For antimissile defense systems, use 74B.

75E-Missile Trajectories & Reentry Dynamics

Determination, analysis, and processing of missile trajectory data; Flight path analysis; Impact prediction; Atmospheric reentry. Includes aerodynamic studies.

For spacecraft reentry, use 84D.

75F-Missile Warheads & Fuses

Design and performance of all types of missile warheads and fuzes-chemical, biological, nuclear and explosive.

For rockets, use 79H.

75G-Surface-Launched Missiles

Design, construction, and performance of missiles launched from the ground, surface platforms, vehicles, silos, and surface ships.

75H-Underwater-Launched Missiles

Design, construction, and performance of missiles launched from underwater.

48-Natural Resources & Earth Sciences

480-General

48A-Mineral Industries

Industries and their processes that exploit metallic and nonmetallic, fuel and nonfuel resources. Includes coal mining, mining wastes, and acid mine drainage; Coal preparation; Petroleum exploration, drilling, and production; Metals exploration and mining; Exploration geophysics and seismology; Reserves; Mine safety; Mineral economics; Underwater and continental shelf mining; Natural resources studies (excluding Earth Resource Satellite Surveys).

If energy source production related, use 97.

For petroleum refining, use 97K and 99B.

48B-Natural Resource Management

Conservation and management of natural resources, including land and soil, water, forest, grassland, and other vegetation; Fish and wildlife management; Mineral management; Policies and legislation including game laws and licensing; Water resource management; Water supply; Deforestation; Forest fire prevention.

See also 98F, 48A, 48C, and 48D.

48C-Natural Resource Surveys

Use of scientific satellites, aerial photography, and other remote sensing techniques to scan the earth's surface in data gathering experiments on soils, mineral resources, hydrology, animals, forests, and other resources; Surveying techniques such as image processing, photointerpretation, and pattern recognition.

For agricultural resource surveys, use 98G; For equipment studies, use 63.

48D-Forestry

Forest description and measurement; Forest influences; Forest protection and management; Harvesting, logging, sawmills, and transportation; Silviculture; Forest nurseries; Afforestation reforestation, and deforestation; Forest fires and prevention.

For wood utilization, use 71R.

48E-Soil Sciences

Soil biology, chemistry, moisture, mineralogy, classification, surveys; Soil erosion and its prevention; Land reclamation, terracing, contouring, polders, tillage, and fertility; Soil banks.

For irrigation, use 98C.

For mechanical and engineering properties, use 50D.

48F-Geology & Geophysics

Structure, properties, and classification of rocks; Paleontology; Stratigraphy; Geodesy; Structural geology; Engineering geology; Vulcanology; Petrology; Petrography; Tectonics.

For astrogeology, use 54A.

For geological studies relating to energy or mineral reserves, use 97A and 48A respectively.

For marine geology and geophysics, use 47E.

48G-Hydrology & Limnology

Properties, distribution, and circulation of fresh water, including its surface and underground occurrence; Physical and chemical conditions in fresh water bodies; Eutrophication; Chemical-biological interrelationships; Water runoff; Water losses; Ground water; Streams; Aquifers.

For studies of estuaries or sea water, use 47.

48H-Snow, Ice, & Permafrost

Physical characteristics including trafficability, stability, and mechanical properties; Glaciology.

For sea ice, use 47C, and for sea ice movement, use 47B.

48I-Cartography

Map making; Photogrammetry; Terrain models; Topography. Geographic information systems; Cartography; Actual physical processes, procedures, and methods of map making.

76-Navigation, Guidance, & Control

760-General

76A-Control Devices & Equipment

Navigation and guidance control equipment.

See also 76C.

76B-Guidance Systems

Design, development, and performance of complete guidance systems. Includes integration of specific components and subsystems necessary to assure course positioning.

76C-Navigation & Guidance System Components

Navigation computers; Gyros, radiators, sensors, indicators, etc., used in navigation of aircraft, ships, spacecraft, and ground vehicles.

76D-Navigation Systems

Design, development, and performance of complete navigation systems; Integration of specific components and subsystems necessary in direction finding (position, distance, and course of travel); Global navigation systems.

See also 85F.

77-Nuclear Science & Technology

770-General

Includes nuclear materials management, safeguards, accounting methods.

See also 77I.

77A-Fusion Devices (Thermonuclear)

Theory, design, construction, and operation of devices for producing controlled thermonuclear fusion reactions; Nuclear fusion reactor materials and fuels.

For plasma studies in thermonuclear devices, see also 46G.

77B-Isotopes

Identification, separation, and concentration of radioactive isotopes. Includes isotopic irradiation devices.

For radioactive isotopes polluting the environment, use 68F.

For the use of isotopes in labeling chemical reactions, use 99F.

For the use of isotopes in medical/biological applications, use 57.

77C-Nuclear Auxiliary Power Systems

SNAP technology, both isotopic and reactor; Isotopic power supplies; Small scale electricity generation by nuclear means.

For nuclear propulsion, see the field of application.

77D-Nuclear Explosions & Devices

Explosion effects, including shock waves, ground motion, electromagnetic pulses, primary radiation, injection of charged particles into radiation belts; Testing of nuclear devices (including nuclear simulation using chemical explosives); Peaceful applications (e.g., Plowshare).

For effects on communications and electronics systems, see the field of application.

For military applications, use 74H.

77E-Nuclear Instrumentation

Nuclear radiation detection and measurement devices and systems; Beta particle detectors.

For X-ray detectors, use 46Gen.

For health physics instrumentation, use 57V.

77F-Radiation Shielding, Protection, & Safety

Shielding design, nuclear radiation transport properties of materials, decontamination; Container design and transportation requirements for radioactive materials; Fallout shelters.

See also 91I.

77G-Radioactive Wastes & Radioactivity

Separation, processing, handling, storage, disposal, and reuse of radioactive wastes; Radioactive fallout; Fission products; Man-made or natural radioactivity; Decommissioning.

For radiation pollution, use 68F.

77H-Reactor Engineering & Nuclear Power Plants

Engineering related directly to the design, safety, and operation of a reactor; Research and test reactors. Integrated assemblage, including reactor and turbogenerator equipment, plus control and regulatory devices of a nuclear power plant, either mobile or stationary; Includes site selection and feasibility studies; Engineering aspects of reactor accidents.

See also 77C.

For critical assemblies and reactor simulation, use 77K.

77I-Reactor Fuels & Fuel Processing

Production, testing, design, or reclamation of nuclear fuel materials, reactor fuel elements (includes cladding) and fuel assemblies. Includes nuclear fuelcycle studies for nuclear materials management; Nuclear fuel reprocessing.

For processing of nonrecoverable fuel materials and fuel contaminants, use 77G.

77J-Reactor Materials

Production, testing, design, or reclamation of coolants, control materials, moderators, structural materials such as pipe materials; Shielding materials, and steels. Includes fabricated elements or assemblies and specific configurations.

For the effects of radiation on materials, see also 71L or 71J.

For fuel materials, cladding, or fuel assemblies, use 77I. Excludes power generating equipment and nuclear fusion reactor materials.

77K-Reactor Physics

Reactor kinetics, reactor theory, neutron transport theory, and criticality. Includes critical assemblies and reactor simulators.

47-Ocean Sciences & Technology

470-General

Includes breakwaters; Onshore and offshore facilities; Ocean dredging operations; Beach erosion; Harbor engineering; Ocean mining; Anchors; Buoys; Seakeeping; Diving operations and equipment; Decompression equipment.

See also 50B, 47H, and 95E.

47A-Marine Engineering

Design, construction, and maintenance of ships, boats, and related equipment; Salvage operations; Naval architecture; Shipyards and shipbuilding; Submarines; Shipborne containerization.

See also 85G.

47B-Dynamic Oceanography

Ocean waves; Sea level changes; Ocean currents; Ocean tides; Littoral transport; Sea ice movement.

47C-Physical & Chemical Oceanography

Physical and chemical properties of sea water, the ocean bottom, and estuaries; Sea ice.

For glaciers and fresh water ice, use 48H.

47D-Biological Oceanography

Plant and animal life in the marine environment; Biological fouling; Marine ecology; Biological aspects of mariculture; Use of marine organisms as bioassay systems; Marine aspects of estuaries; Marine biology of anadromous fishes.

See also 57C, 57H, 57K, 57F, 57Z, and 98F.

47E-Marine Geophysics & Geology

Geophysical and geological studies and surveys as applied to a marine environment; Plate tectonics; Sea floor spreading; Continental drift.

See also 48F.

47F-Oceanographic Vessels, Instruments, & Platforms

Instrumentation and equipment to collect and process oceanographic data; Remote sensors.

47G-Hydrography

Hydrographic surveying; Ocean bottom topography; Bathymetry.

47H-Underwater Construction & Habitats

Closed environments; Underwater work and construction; Underwater construction equipment.

See also 47Gen or 95E.

79-Ordnance

790-General

79A-Ammunition, Explosives, & Pyrotechnics

Projectiles, fuzes, demolition explosives, detonators, grenades, land mines, high explosives, primers, powder and liquid propellants, flame throwers, and equipment for handling these items; Production, performance, storage stability of incendiaries, pyrotechnics, screening agents (smokes), etc.

For nuclear weapons, use 74H.

For rocket propellants, use 81.

79B-Armor

Design, testing, and performance of armor and armor plate including bullet proof, flak proof, explosion proof, and fragment proof devices and related equipment.

For other types of protective devices, see the application.

79C-Bombs

High-explosive, fragmentation, antipersonnel, armor piercing, incendiary, napalm, general purpose, and similar types of bombs; Bomb handling equipment; Storage.

For bomb directors and bomb release mechanisms, use 79F; For nuclear bombs, use 74H.

79D-Combat Vehicles

Military vehicles including armored wheeled and track-laying vehicles, tanks and reconnaissance vehicles, trucks, gun carriers; Components and accessories.

79E-Detonations, Explosion Effects, & Ballistics

Explosion effects (except nuclear) such as blast, shock waves, detonation waves, cratering, earth motion or movement, heat, etc.; Interior, exterior, and terminal ballistics; The study of motion, behavior, and aerodynamics of projectiles thrown or launched by ordnance projectors; Includes target vulnerability and damage assessment studies, weapons effects.

For nuclear explosion effects, use 77D.

79F-Fire Control & Bombing Systems

Fire control computers, sights, directors, range finders, gunlaying, bombing radar systems, boresighting, bomb releases, and other devices used specifically for directing the firing of weapons or the dropping of bombs.

79G-Guns

Small arms, automatic weapons, antipersonnel weapons, recoiless weapons, mortars, artillery and naval guns, their accessories and components; Gun carriages, gun mounts, remote control equipment, etc.

For ballistic studies, use 79E.

For gun control, social violence, use 92C or 43.

79H-Rockets

Unguided, self-propelled projectiles whose trajectory or course cannot be altered after launch; Ground launched, air launched, or ship launched rockets, launchers, and launch support equipment.

For sounding rockets, use 55D.

79I-Underwater Ordnance

Torpedoes, submarine mines, depth charges, hydrobombs, antisubmarine ammunition, etc.; Launching devices and support equipment.

82-Photography & Recording Devices

820-General

82A-Holography

Techniques, materials, and uses of holography and holograms; Acoustic holography.

See also 46C.

82B-Photographic Techniques & Equipment

Photographic techniques, including aerial photography, color photography, astronomical photography, cinematography, photomicrography, Schlieren photography; Cameras, lenses, shutters, projectors, photographic processes, and materials; Microphotography, Photographic copying; Direct recording and reproduction of visual images; Copying, reproduction and replication techniques; Thermography; Lithography, and related arts; Graphic arts, illustrating, visual design.

For photogrammetry, use 48I.

82C-Recording Devices

Techniques and devices for recording other than visual images. Includes disk, magnetic, thermoplastic, electrostatic recording systems, CD-ROM, and playback equipment such as record players, tape recorders, etc.

46-Physics

460-General

Includes electron and X-ray optics; Thermodynamics; Nuclear physics; elementary particles; Atomic and molecular physics.

46A-Acoustics

Generation and transmission of sound through various media or enclosures. Includes ultrasonic and infrasonic radiation.

See also 63A.

46B-Fluid Mechanics

Theoretical and experimental studies of the dynamics and statics of fluids and of relative motion between fluids and solid bodies; Aerodynamics and hydrodynamics; Water tunnel studies and equipment.

For wind tunnel equipment and facilities, use 51F.

For operational applications, use 51A, 75E, and 84D.

For plasma physics, use 46G.

46C-Optics & Lasers

Generation and propagation of electromagnetic waves in the infrared, visible, and ultraviolet region of the spectrum; Theory; Design and performance of optical equipment; Lasers and masers.

46D-Solid State Physics

Physical properties of solids as related to their structure. Fundamental research and theoretical studies on semiconductors, superconductors, structure of solids. Includes crystallography and superconductivity.

For semiconductor devices, use 49H.

For structural mechanics, use 46E.

For studies on ceramics, coatings, composite materials, metals, and alloys, use 71.

46E-Structural Mechanics

Dynamics and statics of solid bodies; Kinematics; Shock and vibration.

46G-Plasma Physics

Properties and actions of plasmas, including magnetohydrodynamics, pinch effect, plasma oscillations, plasma jets; Plasma diagnostics; Plasma dynamics. Plasmas in thermonuclear devices.

See also 77A.

For MHD generators, use 97O.

For astrophysics, use 54C.

For aeronomy, use 55A.

46H-Radiofrequency Waves

Generation and propagation of radiofrequency waves.

For communication systems, techniques, equipment, etc., use 45.

For radiofrequency detection, use 63H.

43-Problem-Solving Information for State & Local Governments

430-General

Includes internal government administration; State programs; Criminal justice, corrections planning, and administration.

43A-Finance

Taxation; Revenue; Budgeting; Revenue sharing; Financing; Allocation.

See also 91G and 91H.

For commercial banking and finance operations, use 96F.

43B-Economic & Community Development

Land use planning; Urban renewal; Economic effects; Economic planning and development; Recreation planning and development; Economic readjustment.

See also 91J and 96A.

43C-Human Resources

Education; Social services; Health care services; Manpower.

See also 9lK and 92C.

43D-Police, Fire, & Emergency Services

Police and fire services and administration; Disaster services; Civil defense; Emergency weather services, Pollution alerts; Civil disturbances; Ambulance services; Disaster relief.

See also 91C and 91I.

43E-Energy

Management and planning on energy resources, use and production; Government administration and forecasting.

See also 97.

43F-Environment

Air, water, noise, waste management and planning; Monitoring services.

See also 68.

43G-Transportation

Planning for modes of public, private, and cargo transportation; Highway planning, Parking; Traffic engineering.

See also 85 and 91B.

84-Space Technology

840-General
Extraterrestial biology, chemistry, and medicine.

84A-Astronautics
Space missions; Projects and logistics; Orbital rendezvous; Space exploration; Spacecraft operating problems; Extravehicular activity.

84B-Extraterrestial Exploration
Space probe exploration; Space landings; Space construction and maintenance; Extravehicular activity on other planets.

84C-Manned Spacecraft
Design and construction of manned spacecraft, space stations, aerospace planes and their components.

84D-Spacecraft Trajectories & Flight Mechanics
Determination, analysis, processing of spacecraft trajectory data; Space mechanics; Orbital calculations; Flight path analysis; Atmosphere entry; Reentry dynamics.

84E-Space Launch Vehicles & Support Equipment
Handling and launching, including transportation, storage, preparation for launching, countdown, launching equipment, checkout equipment,
ground support equipment, and information systems; Spacecraft tracking systems; Tracking networks; Recovery support.

84F-Space Safety
Safety measures and devices directed toward reducing the hazards of spaceflight.

84G-Unmanned Spacecraft
Design and construction of unmanned spacecraft, including space probes, scientific satellites, military satellites, communication satellites, reconnaissance satellites, and navigational satellites.

For satellites applied to a specific application, see the field of application.

85-Transportation

850-General

85A-Air Transportation
Operation of systems for transport by air; Civil aviation; Airports and airport access; Airline operations;
Air routing; Air traffic control systems; Multimodal systems; Aviation safety and aviation accidents; Aircraft fires; Aircraft fuel fires.

See also 43G, 74E, 76, 85D, and 91B.

For design of aircraft and components, use 51 and 81.

For runway construction and design, use 50B.

85C-Metropolitan Rail Transportation
Urban rail transit; Underground and above-ground rapid transit railways, including subways; Automated guideway transit systems; Tracked air cushion vehicles.

See also 85I and 91B.

85D-Transportation Safety
Safety and accidents involving air, land, and water transportation; Accident studies and prevention; Alcohol related studies; Breakaway barriers and structures; Standards and testing of components and equipment; Crashworthiness; Traffic safety; Collision research; Safety equipment and devices.

See also 91B.

For pipeline accidents, use 85E.

85E-Pipeline Transportation
Transportation of liquids, gases, and slurries through long-distance pipelines; Accidents and safety.

85F-Global Navigation Systems
Worldwide navigational aids to transportation; Global positioning system (GPS).

See also 76D.

85G-Marine & Waterway Transportation
Shipping; Safety and accidents; Safety equipment; Cargo handling and equipment; Cargo movement; Passenger movement; Traffic control; Boating; Trade routes; Shipborne containerization.

See also 43G, 74E, 76, and 85D.

For marine engineering, use 47A.

For waterway engineering, use 50B.

85H-Road Transportation
Passenger and cargo movement; Design and standards for vehicles and components; Motor vehicle engine studies; Safety engineering; Safety devices; Traffic and road safety; Collision research; Accident studies; Highway traffic; Traffic engineering; Passenger and cargo vehicles; Trailers; Motorcycles; Bicycles and bikeways; Hiking trails.

See also 43G, 50A, 74E, 81J, 85D, and 91B.

85I-Railroad Transportation
Safety and accidents; Safety equipment; Cargo handling and equipment; Cargo movement; Passenger movement; Traffic control; Terminals; Amtrak; Track studies; Rolling stock; Scheduling; Railroad engineering and equipment.

See also 43G, 85D, and 91B.

91-Urban & Regional Technology & Development

910-General
Includes energy studies.

91A-Environmental Management & Planning
Air, water, noise, and waste management and control; Monitoring services; Solid wastes and recycling;
Solid waste landfills; Water quality management; Environmental surveys; Design and operation of sewer systems (combined, etc.); Water supplies and services; Excludes natural resource management.

See also 68 and 43F.

91B-Transportation & Traffic Planning
Planning for modes of public and private, passenger and cargo transporation; Travel patterns and demand; Parking; Traffic engineering, traffic flow and control; Traffic surveys; Highway and street services; Rapid transit systems; Passenger transportation and planning; Pedestrian movement.

See also 43G and 85.

91C-Fire Services, Law Enforcement, & Criminal Justice
Fire, police, and court services and their administration; Law enforcement and criminal justice; Crime and fire prevention; Personnel recruitment, training, and utilization; Parole; Work release; Correctional institutions.

See also 43D.

For criminal justice and corrections, see also 43Gen.

91D-Communications

Use and planning of communications; Mass media, emergency communications, public information.

See also 45.

91E-Housing

Surveys and assessments of existing housing; Planning and development; Building codes; Housing needs; Housing renovation; Public housing.

For design, architectural, or construction related studies, see also 89.

91F-Health Services

Urban health services; Emergency medical services; Mental health services; Nursing homes; Ambulatory health services; Hospital services; Public health access.

See also 43C, 43D, 44 and 91I.

91G-Urban Administration & Planning

General administration and planning; Feasibility studies; Appraisal of real property; Taxation; Land use and zoning; Urban revitalization; Financing.

See also 43 and 70F.

91H-Regional Administration & Planning

General administration and planning for county and regional areas that may also contain urban or urbanized areas; Intergovernmental relations and interactions (State, County, Local); Land use and zoning.

See also 43 and 70F.

For state government administration and planning, use 43.

91I-Emergency Services & Planning

Disaster services; Civil defense; Early warning systems and emergency preparedness for all types of disaster; Emergency weather services; Pollution alerts; Civil disturbances; Ambulance services; Flooding; Disaster relief.

See also 43D, 44, and 91F.

For military passive defense systems, see also 74I.

For personnel detection, see also 63G.

91J-Economic Studies

Economic analyses; Economic development; Industrial development; Economic impacts of development; Population-economy-income studies; Employment and earnings; Property values; Commercial area studies.

See also 43B and 96.

For government financial operations, use 43A, 70F, 91G, and 91H.

91K-Social Services

Child care; Family and youth counseling; Social rehabilitation; Foster homes and adoption; Welfare and public assistance; Financial assistance; Food stamp services; Employment services; Legal services.

See also 43C, 91F, and 92C.

NTIS Subject Categories
Numerical Listing of Major Categories

Appendix D

Primary category titles arranged by subject category code. This list will assist you in using the cross reference category codes provided in many of the descriptions.

41 Manufacturing Technology
43 Problem Solving Information for State & Local Governments
44 Health Care
45 Communications
46 Physics
47 Ocean Sciences & Technology
48 Natural Resources & Earth Sciences
49 Electrotechnology
50 Civil Engineering
51 Aeronautics & Aerodynamics
54 Astronomy & Astrophysics
55 Atmospheric Sciences
57 Medicine & Biology
62 Computers, Control & Information Theory
63 Detection & Countermeasures
68 Environmental Pollution & Control
70 Administration & Management
71 Materials Sciences
72 Mathematical Sciences
74 Military Sciences
75 Missile Technology
76 Navigation, Guidance &Control
77 Nuclear Science & Technology
79 Ordnance
81 Combustion, Engines, & Propellants
82 Photography & Recording Devices
84 Space Technology
85 Transportation
88 Library & Information Sciences
89 Building Industry Technology
90 Government Inventions for Licensing
91 Urban & Regional Technology & Development
92 Behavior & Society
94 Industrial & Mechanical Engineering
95 Biomedical Technology & Human Factors Engineering
96 Business & Economics
97 Energy
98 Agriculture & Food
99 Chemistry

NTIS Subject Categories Numerical Listing with Scope Descriptions

Appendix E

41-Manufacturing Technology

410-General

Includes mechanical elements; Pipes; Tubes; Levers; Cams; Springs; Clutches; Gears; Valves; Filters; Containers and packing materials; Refrigeration systems and equipment; Industrial furnaces and boilers; Heat exchangers; Heat pumps; Heat pipes; Energy management, economics, and financing; International issues.

See also 94O and 97G.

For engine components, use 81.

For fuel tanks, use 81C.

For cooling towers, use 97J.

41A-Computer Aided Design (CAD)

Application of computer hardware and software (programs) to enhance the design, computations, simulation, analysis and modeling, presentations, graphics, drafting, data base creation and human-machine interface, associated with the creation of engineering design specifications.

See also 94A.

41B-Computer Aided Manufacturing (CAM)

Application of computer hardware and software (programs) to enhance materials planning, processing and handling, tooling; Assembly; Quality and reliability control; Inspection; Tests; Scheduling and control; Facilities and equipment maintenance; Group technology applications; Inventory control (raw material, in process and finished); Numerical controls and automation; The creation of Direct Numerical Control (DNC) and Computer Numerical Control (CNC) manufacturing cells and systems.

See also 94A and 94G.

41C-Robotics/Robots

Application of computer hardware and software, controls, sensors, electromechanical and hydro-mechanical devices, to the creation of robots and the application of robots to all facets of manufacturing. Study of biological processes in order to develop engineering systems; Pattern recognition systems based on biological models. Includes feature extraction; Image enhancement; Image restoration; Scene analysis; Character recognition.

See also 95F and 62F.

41D-Productivity

Productivity of employees, management, and services; Improving quality of worklife; Measurement of productivity efficiency and effectiveness; Employee attitudes and motivation; Manpower utilization and performance improvement, job satisfaction, job security; Labor-management, job redesign; Alternative work schedules; Incentive plans; Productivity barriers including regulation, obsolete practices; Paperwork, and financing methods.

See also 70G and 70D.

41E-Manufacturing, Planning, Processing & Control

Fabrication, assembling, cleaning, and finishing; Industrial and manufacturing processes (limited to in-depth studies that directly discuss specific processes); Materials forming and machining; Heat treatment; Fabrication and manufacturing; Layout; Coating processes; Materials handling and control, including palletizing, conveying, warehousing, storing, containerization, and packaging; Time and motion studies; Scheduling; Production controls and programming; Modeling techniques and program controls; Inventory management.

See also 94A.

For the beneficiation and processing of minerals, use 48A.

For chemical engineering and processing, use 99B.

For computer-aided manufacturing, use 41B and 94G.

For lasers used in manufacturing, use 41M.

For processing and packaging of food, use 98H.

For production of materials, use 71.

41F-Joining

Bonding and joining including gluing, welding, soldering, brazing, and fastening; Joints and fasteners; Physical, mechanical, and structural properties of adhesives, sealants, glue, binders, seals, and gaskets.

See also 94G, 94Gen, and 71B.

41G-Quality Control & Reliability

Tolerance allocation; Maintainability requirements; Probability of satisfactory performance of components and equipment; Inspection methods; Reliability theory; Quality assurance; Nondestructive testing having industrial application; Ultrasonic, radiographic, hydrostatic, magnetic, and optical nondestructive techniques and equipment; Nondestructive testing of flaws, thickness, opacity, strength; Destructive industrial testing; Metrology.

See also 94B, 94J, and 94Gen.

41H-Plant Design & Maintenance

Site selection; Plant design; Maintenance Management; Scheduled, routine, and corrective maintenance; Security.

See also 94C.

41I-Job Environment

Industrial hygiene and occupational safety and health. See also 57U, 68G, and 44G. Workplace layout and design; Human factors engineering; Includes Industrial psychology and Industrial sociology; Worker interactions.

See also 94D and 95D.

Includes environmental engineering equipment related to industrial use. See also 97J, 89B, and 94E.

For mine safety, use 48A.

For ordnance safety, use 79A.

For nuclear radiation safety, use 77.

For transportation safety, use 85D.

41J-Tooling, Machinery, & Tools

Machine subassemblies; Tools; Machinery including hoists, conveyors, and pumps; Design, production performance, and testing of hydraulic and pneumatic systems, accumulators, actuators, compressors and distribution equipment; Fluidic and flueric devices; Ergonomics interaction of man and equipment in terms of subsystem and system performance requirements and evaluation; Man-machine systems and human factors engineering.

See also 94F, 94I, 94D, and 95D.

For hydraulic fluids, use 71K.

41K-Engineering Materials

Performance; Properties, fabrication and manufacturing methods of ceramics, coatings and composite materials including ceramic coatings, ceramic fibers, corrosion resistant coatings, reinforced plastics, graphite or carbon composites, laminates; Metal matrix composites, and fiber and particulate composites.

See also 71B, 71D, and 71F.

41L-Tribology

Friction, lubrication and wear, including bearings; Unwanted chemical reaction effects on metals, corrosion of metals and corrosion resistant coatings; Lubricants.

See also 71L, 71G, and 71K.

41M-Optics & Lasers

Design and performance of optical equipment for use in manufacturing applications. Includes laser applications such as laser annealing, cutting, drilling, and welding.

See also 46C.

41N-Computer Software

Computer programming; Programming languages; Compilers; Data base management systems;
CAD/CAM robotics.

See also 62B.

41O-Domestic Commerce, Marketing, & Economics

Economic impacts on industries; Productivity; Wage surveys; Domestic market surveys.

See also 96A.

41P-Research Program Administration & Technology Transfer

Research needs; Technology transfer and forecasting.

See also 70E.

43-Problem Solving Information for State & Local Governments

430-General

Includes internal government administration; State programs; Criminal justice, corrections planning, and administration.

43A-Finance

Taxation; Revenue; Budgeting; Revenue sharing; Financing; Allocation.

See also 91G and 91H.

For commercial banking and finance operations, use 96F.

43B-Economic & Community Development

Land use planning; Urban renewal; Economic effects; Economic planning and development; Recreation planning and development; Economic readjustment.

See also 91J and 96A.

43C-Human Resources

Education; Social services; Health care services; Manpower.

See also 9lK and 92C.

43D-Police, Fire, & Emergency Services

Police and fire services and administration; Disaster services; Civil defense; Emergency weather services, Pollution alerts; Civil disturbances; Ambulance services; Disaster relief.

See also 91C and 91I.

43E-Energy

Management and planning on energy resources, use and production; Government administration and forecasting.

See also 97.

43F-Environment

Air, water, noise, waste management and planning; Monitoring services.

See also 68.

43G-Transportation

Planning for modes of public, private, and cargo transportation; Highway planning, Parking; Traffic engineering.

See also 85 and 91B.

44-Health Care

440-General

44A-Planning Methodology

Health planning theory including methods, tactics, techniques and policies; Evaluation of planning theories and processes.

44B-Agency Administrative & Financial Management

Management practices and policies regarding technical assistance, evaluation of health care agency activities, public relations; Financial management and accounting methods.

44C-Community & Population Characteristics

Data and numerical information including health status, quality of care, malpractice, health care needs/demands; Health care utilization, health care cost, vital statistics; Demographic information, economic, environmental, nutritional, and societal factors affecting health, and health resource distribution.

44D-Health Care Assessment & Quality Assurance

Financial feasibility review, economic impact review, and project review; Certificate of need theory; Health manpower education institutional accreditation; Judicatory procedures, review, and assessment; Quality assurance theory; Certificatory methodology; Health manpower proficiency testing, and public health education evaluation; Classification of health care facilities and health care personnel.

44E-Health Care Measurement Methodology

Measurement of health status, quality of care, health facility supply, health manpower supply, proficiency and productivity, and health care costs; Health care needs/demands and utilization measurement.

See also 44L, 44N, and 44Q.

44F-Health Care Forecasting Methodology

Projecting health care needs/demands and health care utilization; Health care facility supply; Health manpower supply; Health care costs; Home health care; Cross-impact projections.

44G-Environmental & Occupational Factors

Environmental factors affecting health including housing, sanitation, water pollution, solid waste pollution, noise pollution, disease vectors, safety hazards, and occupational and industrial hazards; Overpopulation; Health facility environmental considerations and environmental impact; Energy sources in the health field.

See also 57U and 68G.

44H-Health Care Technology

Descriptions and applications of new health care technology and equipment; Ailment prevention techniques, and technology regarding diagnosis, therapy, rehabilitation, and food and nutrition; Health care equipment and facility design and performance considerations.

See also 57 and 95.

44J-Health Delivery Plans, Projects & Studies

Plans, projects, and studies related to the institutional delivery of health services including state/local health plans, state/local medical facility plans, plans for specific health services, and health delivery feasibility studies.

44K-Health Services

Personal and public health services, patient care, and maintenance of an individual's health status including hospital services acute in-patient services, long-term inpatient services, nursing home services, emergency services, public health services, mental services, nursing services, dental services, and medically-related social services including institution discharge services.

44L-Health Care Needs & Demands

Measurement of health care needs/demands, hospital care, acute in-patient care, long-term in patient care, nursing home care, medical care, mental care, nursing care, dental care, and health insurance; Home health care; Measurements of health manpower requirements/demands.

See also 44E.

44M-Health Resources

Surveys, reports, and studies related to specific health care resources including manpower, facilities, sources of financing, and government and private health-related organizations, agencies and individuals.

44N-Health Care Utilization

Measurements regarding utilization of health resources including manpower, ambulatory care, emergency care, public health care, medical care, mental care, nursing care, dental care, health insurance, health care facilities, and home health care.

See also 44E and 44L.

44P-Health Education & Manpower Training

Health manpower education including curricula and costs; Health manpower education facility needs/demands; Institutional financing; Financing for health related educational institutions; Student recruiting and retention methods; Continuing education; Career guidance and career advancement; Consumer health education and public health education methods.

44Q-Health-Related Costs

Health care costs, indexes, projections, in-patient care costs, acute in-patient care costs, long-term care costs, nursing home care costs, ambulatory care costs, emergency care costs, public health care costs, medical care costs; Insurance costs; Manpower income; Equipment costs; Facility utilization and construction costs; Ailment costs including preventive medicine costs and injury costs; Transportation costs including emergency transportation costs.

44R-Economics & Sociology

Discussions of economic and sociological factors and theories relevant to health care.

44S-Legislation & Regulations

Laws, bills, regulations, and model legislation. Includes certificate of need, health insurance certification, health manpower licensing, health facility licensing, health manpower employment, and support regarding health manpower education.

44T-Data & Information Systems

Techniques regarding information systems including document sources, acquisition, surrogation, and storage; Information retrieval; Data systems, Data gathering; Data processing; Data processing hardware; Information system feasibility studies, and confidentiality of information.

44U-Health Care Delivery Organization & Administration

Hospital and medical practice administration and management; Organizational structure of health services; Management policies and practices regarding personnel, community participation and relations, and coordination with other agencies; Financial management and accounting methods; Financing of health delivery and facilities; Reporting methods and requirements.

45-Communication

450-General

45A-Policies, Regulations, & Studies

Licensing; Legislation; National policies and Federal regulatory controls; Frequency management; Broadcasting standards; Time signals, etc.

45B-Radio & Television Equipment

Design and maintenance of radio and television transmitting and receiving equipment only.

See also 51E.

45C-Common Carrier & Satellite

All communication equipment except radio and television. Optical, radio, microwave, wire, and acoustic communication; Telephone, telemeter, telegraph, television, and radio communication systems; Computer network communications; Digital communication; Intercommunication systems; Optical scanning.

For information systems, see also 88B.

For design and construction of communication satellites, see also 84G.

45D-Sociopolitical

Propaganda; Social communication; Sign language, Effects of communication on society and behavior; Postal service; Mass media communication.

45E-Graphics

Publishing; Printing; Graphic arts; Reprography; Xerography; Facsimile; Desk top publishing.

45F-Verbal

Research and development in vocal communication; Speech intelligibility; Speech recognition.

45G-Communication & Information Theory

Theoretical studies relating to the measurement and transmission of information in a communication channel. Includes coding theory, information capacity, detection of signals in noise.

See also 62E.

46-Physics

460-General
Includes electron and X-ray optics; Thermodynamics; Nuclear physics; elementary particles; Atomic and molecular physics.

46A-Acoustics
Generation and transmission of sound through various media or enclosures. Includes ultrasonic and infrasonic radiation.

See also 63A.

46B-Fluid Mechanics
Theoretical and experimental studies of the dynamics and statics of fluids and of relative motion between fluids and solid bodies; Aerodynamics and hydrodynamics; Water tunnel studies and equipment.

For wind tunnel equipment and facilities, use 51F.

For operational applications, use 51A, 75E, and 84D.

For plasma physics, use 46G.

46C-Optics & Lasers
Generation and propagation of electromagnetic waves in the infrared, visible, and ultraviolet region of the spectrum; Theory; Design and performance of optical equipment; Lasers and masers.

46D-Solid State Physics
Physical properties of solids as related to their structure. Fundamental research and theoretical studies on semiconductors, superconductors, structure of solids. Includes crystallography and superconductivity.

For semiconductor devices, use 49H.

For structural mechanics, use 46E.

For studies on ceramics, coatings, composite materials, metals, and alloys, use 71.

46E-Structural Mechanics
Dynamics and statics of solid bodies; Kinematics; Shock and vibration.

46G-Plasma Physics
Properties and actions of plasmas, including magnetohydrodynamics, pinch effect, plasma oscillations, plasma jets; Plasma diagnostics; Plasma dynamics. Plasmas in thermonuclear devices.

See also 77A.

For MHD generators, use 97O.

For astrophysics, use 54C.

For aeronomy, use 55A.

46H-Radiofrequency Waves
Generation and propagation of radiofrequency waves.

For communication systems, techniques, equipment, etc., use 45.

For radiofrequency detection, use 63H.

47-Ocean Sciences & Technology

470-General
Includes breakwaters; Onshore and offshore facilities; Ocean dredging operations; Beach erosion; Harbor engineering; Ocean mining; Anchors; Buoys; Seakeeping; Diving operations and equipment; Decompression equipment.

See also 50B, 47H, and 95E.

47A-Marine Engineering
Design, construction, and maintenance of ships, boats, and related equipment; Salvage operations; Naval architecture; Shipyards and shipbuilding; Submarines; Shipborne containerization.

See also 85G.

47B-Dynamic Oceanography
Ocean waves; Sea level changes; Ocean currents; Ocean tides; Littoral transport; Sea ice movement.

47C-Physical & Chemical Oceanography
Physical and chemical properties of sea water, the ocean bottom, and estuaries; Sea ice.

For glaciers and fresh water ice, use 48H.

47D-Biological Oceanography
Plant and animal life in the marine environment; Biological fouling; Marine ecology; Biological aspects of mariculture; Use of marine organisms as bioassay systems; Marine aspects of estuaries; Marine biology of anadromous fishes.

See also 57C, 57H, 57K, 57F, 57Z, and 98F.

47E-Marine Geophysics & Geology
Geophysical and geological studies and surveys as applied to a marine environment; Plate tectonics; Sea floor spreading; Continental drift.

See also 48F.

47F-Oceanographic Vessels, Instruments, & Platforms
Instrumentation and equipment to collect and process oceanographic data; Remote sensors.

47G-Hydrography
Hydrographic surveying; Ocean bottom topography; Bathymetry.

47H-Underwater Construction & Habitats
Closed environments; Underwater work and construction; Underwater construction equipment.

See also 47Gen or 95E.

48-Natural Resources & Earth Sciences

480-General

48A-Mineral Industries
Industries and their processes that exploit metallic and nonmetallic, fuel and nonfuel resources. Includes coal mining, mining wastes, and acid mine drainage; Coal preparation; Petroleum exploration, drilling, and production; Metals exploration and mining; Exploration geophysics and seismology; Reserves; Mine safety; Mineral economics; Underwater and continental shelf mining; Natural resources studies (excluding Earth Resource Satellite Surveys).
If energy source production related, use 97.

For petroleum refining, use 97K and 99B.

48B-Natural Resource Management
Conservation and management of natural resources, including land and soil, water, forest, grassland, and other vegetation; Fish and wildlife management; Mineral management; Policies and legislation including game laws and licensing; Water resource management; Water supply; Deforestation; Forest fire prevention.

See also 98F, 48A, 48C, and 48D.

48C-Natural Resource Surveys

Use of scientific satellites, aerial photography, and other remote sensing techniques to scan the earth's surface in data gathering experiments on soils, mineral resources, hydrology, animals, forests, and other resources; Surveying techniques such as image processing, photointerpretation, and pattern recognition.

For agricultural resource surveys, use 98G; For equipment studies, use 63.

48D-Forestry

Forest description and measurement; Forest influences; Forest protection and management; Harvesting, logging, sawmills, and transportation; Silviculture; Forest nurseries; Afforestation reforestation, and deforestation; Forest fires and prevention.

For wood utilization, use 71R.

48E-Soil Sciences

Soil biology, chemistry, moisture, mineralogy, classification, surveys; Soil erosion and its prevention; Land reclamation, terracing, contouring, polders, tillage, and fertility; Soil banks.

For irrigation, use 98C.

For mechanical and engineering properties, use 50D.

48F-Geology & Geophysics

Structure, properties, and classification of rocks; Paleontology; Stratigraphy; Geodesy; Structural geology; Engineering geology; Vulcanology; Petrology; Petrography; Tectonics.

For astrogeology, use 54A.

For geological studies relating to energy or mineral reserves, use 97A and 48A respectively.

For marine geology and geophysics, use 47E.

48G-Hydrology & Limnology

Properties, distribution, and circulation of fresh water, including its surface and underground occurrence; Physical and chemical conditions in fresh water bodies; Eutrophication; Chemical-biological interrelationships; Water runoff; Water losses; Ground water; Streams; Aquifers.

For studies of estuaries or sea water, use 47.

48H-Snow, Ice, & Permafrost

Physical characteristics including trafficability, stability, and mechanical properties; Glaciology.

For sea ice, use 47C, and for sea ice movement, use 47B.

48I-Cartography

Map making; Photogrammetry; Terrain models; Topography. Geographic information systems; Cartography; Actual physical processes, procedures, and methods of map making.

49-Electrotechnology

490-General

Includes standards, measurements, and instrumentation not applied to any other subcategories.

49A-Antennas

Antennas; Antenna theory; Antenna radiation patterns; Radomes.

49B-Circuits

Circuit theory; Network analysis; Filters; Oscillators; Logic circuits; Printed circuits; Electronic modules; Commutators; Power supply circuits; Waveform generators; Analog to digital converters; Phase locked systems.

For integrated circuits, use 49H.

49C-Electromechanical Devices

Electric motors; Relays; Mechanical switches; Connectors; Circuit breakers; Electric fuses.

49D-Electron Tubes

All electron tubes except those in 49E.

49E-Optoelectronic Devices & Systems

Display systems; Phototubes; Image tubes; Cathode ray tubes; Electroluminescent panels; Light emitting diodes; Photodiodes; Phototransistors; Magnetooptics; Electrooptics; Optical detectors, including infrared and ultraviolet detectors.

See also 63C and 63F.

For solar cells, see also 97N.

For lasers, use 46C.

49F-Power & Signal Transmission Devices

Transmission lines; Electric wire and cable; Waveguides; Fiber optics transmission lines.

49G-Resistive, Capacitive, & Inductive Components

Resistors; Capacitors; Inductors; Transformers; Electromagnets; Potentiometers; Thermistors; Delay lines; Transducers; Crystal resonators. Includes miscellaneous and basic components.

49H-Semiconductor Devices

Transistors; Semiconductor diodes; Integrated circuits.

For photodiodes, phototransistors, light emitting diodes, and optical detectors, use 49E.

50-Civil Engineering

500-General

50A-Highway Engineering

Construction of roads and highways; Highway and rights-of-way maintenance including weed control; Bridges and bridge systems; Highway paints and markings; Highway and road signs; Beautification; Slope stability and soil subbases.

50B-Civil Engineering

Dredging; Dams; Water purification; Reservoir engineering; Flood control; Sewers; Waterway engineering; Runway construction; Shore protection; Breakwaters; Harbor engineering; Tunneling.

See also 47.

For sewage treatment, use 68D.

For building construction, use 89.

For oil and gas reservoir engineering, use 97 or 48A.

50C-Construction Equipment, Materials, & Supplies

Excavation and earth moving equipment; Hoisting and conveying equipment; Concrete and cement.

See also 89G.

For properties of concrete and cement, see also 71D.

50D-Soil & Rock Mechanics

Physical properties of soil and rock for utilization in engineering; Landslides; Soil stabilization.

For soil sciences, use 48E.

For soil conservation, use 48B.

For geology and geophysics, use 48F.

51-Aeronautics & Aerodynamics

510-General
Includes landing mats.

51A-Aerodynamics
Aerodynamic characteristics and problems of bodies as they are affected by the dynamics of phenomena relating to boundary layer, lift, drag, laminar and turbulent flow, compressible flow, lift, aerodynamic heating, vortex flow, wake, etc. in aerodynamic regimes. Includes aircraft, ground vehicles, and structures.

See also 46B.

For missile reentry dynamics, use 75E.

For spacecraft reentry dynamics, use 84D.

51B-Aeronautics
Aircraft operations such as takeoff and landing, all-weather and night flight, taxiing, approach, letdown, in-flight refueling, etc. Includes aviation accidents.

51C-Aircraft
Design, production, and maintenance of aircraft, aircraft components and equipment. Structural studies of airframes, bodies, wings, fuselages; Military and commercial aircraft; Balloons (excludes meteorological balloons); Air cushion vehicles (excludes tracked vehicles).

See also 85A and 81D.

For meteorological balloons, use 55D.

For tracked air cushion vehicles, use 85C.

For electronic equipment, use 51E.

51D-Parachutes & Decelerators
Deployable devices and structures to induce drag and deceleration of aircraft, spacecraft, and test vehicles such as rocket sleds.

51E-Avionics
Airborne electronic equipment. Includes electronic equipment used for communications; Navigation; Control systems; Onboard air traffic control; Detection.

See also 45, 49, 63, and 76.

51F-Test Facilities & Equipment
Wind tunnels; Simulators; Flight simulators.

For flight simulators used for training, use 92A.

54-Astronomy & Astrophysics

540-General

54A-Astrogeology
Studies of the structure and composition of planets and other bodies in the solar system.

For geology and geophysics, see also 48F.

54B-Astronomy & Celestial Mechanics
Positions and motions of the celestial bodies; Ephemerides, Eclipses.

54C-Astrophysics
Physical and chemical aspects of celestial bodies, their origin and evolution. Includes astronomical spectroscopy, radio astronomy, solar structure, and planetary atmospheres.

54D-Cosmic Ray Research
Detection and analysis of cosmic rays.

55-Atmospheric Sciences

550-General

55A-Aeronomy
Physics and chemistry of the upper atmosphere; Composition; Chemical reactions; Aurora; Airglow; Solar-terrestrial relationships.

For cosmic ray research, use 54D.

55B-Dynamic Meteorology
Studies of atmospheric motions; Atmospheric diffusion models; Atmospheric circulation.

For air pollution movement studies, use 68A.

55C-Meteorological Data Collection, Analysis, & Weather Forecasting
Climatology; Satellite meteorology; Weather prediction; Ice forecasting.

55D-Meteorological Instruments & Instrument Platforms
Instruments used to record meteorological parameters; Meteorological balloons; Weather stations; Sounding rockets; Remote sensors.

55E-Physical Meteorology
Acoustical, electrical, optical, and thermodynamic properties of the atmosphere; Cloud physics; Precipitation theory; Global warming.

See also 68A.

55F-Weather Modification
Change of weather conditions through artificial means; Fog dispersal; Artificial precipitation.

57-Medicine & Biology

570-General

57A-Anatomy
Descriptive and comparative anatomy of humans; Anthropometry; Dissection; Neuroanatomy; Morphology.

For plant anatomy, use 57C.

For animal anatomy, use 57Z.

57B-Biochemistry
Studies of the chemical processes which take place in biological systems. Identification and measurement of biochemical substances and methods of analysis, including assaying.

See also 57F, 57L, 57Q, and 99A.

For measurement of biochemical substances for clinical diagnoses, use 57D.

57C-Botany
Study of macroscopic and microscopic plants; Plant anatomy, physiology, pathology, and taxonomy; Phytotoxicity; Includes algae and diatoms.

See also 57H, 57K, 57Y, and 98D.

57D-Clinical Chemistry
Techniques and instrumentation for chemical analysis of body fluids, including blood, and tissues for clinical diagnoses.

See also 99A.

57E-Clinical Medicine

Prevention, diagnosis, and therapy of diseases; Nuclear medicine; Experimental medicine; Clinical protocols.

See also 57J, 57O, and 57X.

For veterinary medicine, use 98E.

For health care services, use 44.

For epidemiology and disease control, use 57U.

57F-Cytology, Genetics, & Molecular Biology

Origin, structure, and functions of living cells and cell components; Hereditary diseases; Use of chemistry and physics to study biological phenomena on the molecular level; Structure and function of biological macromolecules, e.g. proteins and nucleic acids.

See also 57B.

57G-Dentistry

Prevention, diagnosis, and treatment of diseases of the teeth, oral cavity, and associated parts; Oral hygiene.

For dental materials and equipment, use 95C.

For dental prosthetics, use 95A.

For dental services, use 44.

57H-Ecology

Interrelationships of organisms and their environment; Animal, plant, and human ecology; Marine, fresh water, and terrestrial ecology; Ecosystems; Adaptation; Acclimatization; Natural selection; Species diversity; Food chains; Energy balance; Ecological succession; Effects of polluted environments on organisms; Biological productivity.

See also 47D, 48B, 48G, 57C, 57Y, 57Z, 68, 98D, and 98B.

For effects of extreme environments or stimuli on humans, use 57W.

For the interrelationships of humans and their social environments, use 92.

For the effects of industrial environments on humans, use 57U.

57I-Electrophysiology

Electrical activity associated with living organisms and life processes; Electrophysiologic recording including electrocardiography, electroencephalography, and electromyography; Neural transmission; Intracellular potential; Bioelectricity; Bioluminescence; Responses of organisms to electrical stimulation.

57J-Immunology

Mechanisms of immune responses; Antigens and antibodies; Vaccines; Immune serums; Immunization; Immunopathology; Immunohematology; Immunochemistry; Serology; Immunity; Allergy; Histocompatibility; Autoimmune diseases. HIV/AIDS.

See also 57E and 57K.

57K-Microbiology

Studies of microscopic plants and animals; Vaccine and interferon production; Microbial metabolism and biochemistry.

For diagnosis and therapy of infectious diseases, use 57E.

For disease control and epidemiology, use 57U.

For biotechnology applications, see also field of application.

57L-Nutrition

Processes by which humans assimilate and utilize food substances; Experimental nutrition; Nutritive value of foods; Malnutrition; Diet; Food habits; Nutrition surveys; Nutritional requirements; Clinical nutrition.

For food processing, use 98H.

For animal nutrition related to animal husbandry, veterinary medicine or zoology, use 98E or 57Z.

57M-Occupational Therapy, Physical Therapy, & Rehabilitation

Restoration of normal form and function after injury or physical illness; Occupational therapy; Physical therapy; Vocational rehabilitation.

See also 44K, 92A, 95A.

For mental rehabilitation, use 57T.

For social rehabilitation, use 92C and 91K.

For rehabilitation centers, use 44K.

57N-Parasitology

Parasites and parasitism; Host-parasite interactions; Vectors of parasites; Parasitic diseases; Life cycles of parasites.

See also 57H, 57K, and 57P.

57O-Pathology

Studies of the structural and functional changes in tissues and organs which cause or are caused by diseases, trauma or injuries; Gross pathology; Histopathology; Cytopathology; Pathophysiology; Ccmparative and experimental pathology; Histological techniques; Autopsy.

For plant diseases, use 98D.

For animal diseases, use 98E.

For diagnosis and treatment of diseases, use 57E.

For immunopathology, use 57J.

57P-Pest Control

Agents and methods for the control of plant and animal pests; Pesticides, algicides, herbicides, insecticides, molluscacides, fungicides, rodenticides, etc.; Repellants and attractants; Fumigation and extermination; Traps; Biological pest control.

See also 68E and 98C.

For ecological aspects of pest control, use 57H.

57Q-Pharmacology & Pharmacological Chemistry

Synthesis, composition, properties, and effects of drugs; Pharmacy, Pharmacodynamics.

See also 57Y.

For social effects of drugs, use 91C and 92C.

For radiopharmaceuticals, use 57V.

For business studies of the drug industry, use 96A.

57S-Physiology

Functions of the human organism and its parts and comparative physiology; Metabolism; Endocrinology; Neurophysiology; Respiration; Biological rhythms; Growth; Aging; Regeneration.

See also 57B, 57F, 57J, and 57L.

For plant physiology, use 57C.

For animal physiology, use 57Z and 98E.

For psychophysiology, use 57T and 92B.

For electrophysiology, use 57I.

For pathophysiology, use 57O.

For stress physiology, use 57W.

57T-Psychiatry

Prevention, diagnosis, and treatment of mental, emotional, and behavioral disorders; Psychopathology; Psychoanalysis; Neuropsychiatry; Orthopsychiatry; Psychotherapy; Psychophysiology; Psychophysics.

For psychological mechanisms and processes, use 92B.

57U-Public Health & Industrial Medicine

Protection and improvement of community health; Effects of environments on public health; School and public health programs, services, and education; Health screening; Health statistics; Epidemiology; Toxic and infectious disease control; Preventive medicine; Hygiene and sanitation; Drinking water quality; Industrial hygiene and medicine; Safety engineering; Occupational safety and health; Industrial safety and detection equipment; Site-specific investigations.

See also 94D, 94H, 41I and 68G.

For occupational and For occupational and environmental factors related to health planning, use 44G.

57V-Radiobiology

Biological effects of radiation; Dosimetry; Health physics; Radiation sickness and injury; Radiation hazards; Radiation protection; Radiopharmaceuticals. Includes electromagnetic, ultrasonic, and particle radiation.

See also 68F and 99E.

For radioecology, use 57H.

For nuclear medicine, radiology, and radiotherapy, use 57E.

57W-Stress Physiology

Effects of extreme environments or stimuli on human biological processes; Physiological effects of motion, gravity, sound, temperature, electromagnetic, fields, pressure, sensory deprivation, and fatigue; Acclimatization. Includes aerospace and underwater medicine.

See also 51B, 57H, and 84.

For plants, use 57C.

For animals, use 57Z.

For stress psychology, use 92B or 57T.

57X-Surgery

Treatment of diseases, injuries, and deformities by manual or operative methods; Organ and tissue transplantation; Pre-and post-management of surgical patients; Experimental surgery.

See also 95A and 95B.

For dental surgery, use 57G.

For histocompatibility, use 57J.

57Y-Toxicology

Study of the adverse effects of substances on biological systems and the diagnosis and treatment of toxic diseases; Toxicity studies; Risk assessment of chemicals; Antidotes.

See also 57C, 57Q, 57S and 57Z.

57Z-Zoology

Animal anatomy and physiology; Natural history; Animal behavior; Taxonomy.

See also 47D, 48B, 57Y, and 98F.

For animal models used in biomedical research, use the research discipline.

For laboratory and domesticated animal care, or animal diseases, use 98E.

62-Computers, Control & Information Theory

620-General

Includes computer security; Artificial intelligence; Signal processing (unapplied).

62A-Computer Hardware

Design and development of computers and peripheral equipment, including analog computers, digital computers, hybrid computers, special purpose computers, minicomputers, microcomputers; Computer accessories, supplies and installation; Logic circuits; Computer architecture; Computer network hardware.

For computer hardware applied to a specific application, see the field of application.

For Very Large Scale Integration (VLSI), use 49H.

62B-Computer Software

Computer programming; Programming languages; Compilers; Data base management systems; Software tools; Software reliability; Computer graphics.

For computer software and database development applied to a specific application, see the field of application.

For CAD/CAM, use 41A and 41B.

62C-Control Systems & Control Theory

Theoretical studies of open-loop and closed-loop control systems; Automatic control systems; Principles including adaptive, continuous, digital, distributed parameter, linear, multivariable, nonlinear, optional, predictive, and proportional; Process controllers.

See also 72Gen.

For control systems applied to a specific application, see the field of application.

62D-Information Processing Standards

Standards for the use of automatic data processing equipment and systems. Includes standards for hardware, software, applications, and data; Federal Information Processing Standards (FIPS).

62E-Information Theory

Theoretical studies relating to the measurement and transmission of information in a communication channel, including coding theory, information capacity, and detection of signals in noise.

See also 45G.

62F-Pattern Recognition & Image Processing

Includes feature extraction; Image enhancement; Image restoration; Scene analysis; Character recognition; Barcoding; Computer vision.

62R-Applications Software

62S-Data Files

63-Detection & Countermeasures

630-General

Automated access control systems.

For industrial security, see also 94Gen.

63A-Acoustic Detection

Techniques and equipment used for the detection and tracking of objects by means of sound waves, including ultrasonic and infrasonic radiation; Sonar.

For acoustic testing, use 94.

For detection techniques applied to chemistry, meteorology, astronomy, oceanography, medicine, and manufacturing, use 99, 55, 54, 47, 57, 41, and 94, respectively.

63B-Electromagnetic & Acoustic Countermeasures

Interception, jamming, antijamming, and deception of acoustic and electromagnetic signals; Techniques to nullify the use of detection, surveillance, guidance, and communication systems; Radar jamming; Chaff; Counter-countermeasures.

See also 74.

63C-Infrared & Ultraviolet Detection

Techniques and equipment for the detection and tracking of objects by infrared and ultraviolet radiation; Infrared night vision devices; Infrared homing.

See also 76B.

For earth resource surveys, use 48C and 98G.

For mapping, use 48I.

For photography, use 82B.

For nondestructive testing, use 94J.

For detection techniques applied to chemistry, meteorology, astronomy, oceanography, medicine, and manufacturing, use 99, 55, 57, 41, and 94, respectively.

63D-Magnetic Detection

Techniques and equipment for the detection of objects by means of magnetic fields.

For geomagnetism, use 48.

63E-Nuclear Explosion Detection

Techniques and equipment for the detection of nuclear explosions at high altitude, underground, and in space. Includes the use of shock waves, earth movement, and measurement of nuclear radiation levels.

See also other applicable subcategories in 63, especially 63I.

63F-Optical Detection

Techniques and equipment for the detection by means of light. Includes the use of binoculars, periscopes, telescopes, and night vision devices for object detection, and smoke particle detectors.

See also 46C.

For detection using only infrared or ultraviolet radiation, use 63C.

For earth resources surveys, use 48C and 98G.

For photography, use 82B.

For detection techniques applied to chemistry, meteorology, astronomy, oceanography, medicine, and manufacturing, use 99, 55, 54, 47, 41, and 94, respectively.

63G-Personnel Detection

Techniques and equipment for the detection of personnel. Includes the use of acoustic, seismic, olfactory, chemical, and optical detectors; Antiintrusion devices; Motion detectors; Security devices.

For military passive defense systems, see also 74I.

63H-Radiofrequency Detection

Techniques and equipment for the detection and tracking by means of radiofrequency waves; Radar; Microwave detection; See also 76.

For mapping, use 48I.

For detection techniques applied to meteorology, astronomy, oceanography, medicine, and manufacturing, use 55, 54, 57, 41, and 94 respectively.

63I-Seismic Detection

Techniques and equipment for the detection of objects by means of seismic waves.

For earthquake detection, use 48F.

For seismic prospecting, use 48A.

68-Environmental Pollution & Control

680-General

Any study covering multiple types of pollution. Includes broad pollution studies, such as life-cycle analysis of wastes.

68A-Air Pollution & Control

Air pollution from flue gases, exhaust gases, odors, dust, smog, microorganisms, etc.; Control techniques and equipment; Sampling and analytical techniques, and equipment; Waste gas recovery; Biological and ecological effects; Air pollution chemistry; Acid precipitation; Atmospheric motion; Laws, legislation, and regulations; Public administration; Economics; Land use.

See also 43F, 91A, 57, 85, 81, 99A, 99B, and 97R.

For effects on human health, use 68G.

For pesticides and radioactive contaminants, use 68E and 68F respectively.

68B-Noise Pollution & Control

Pollution in the environment by noise from any source including engine noise, traffic and transportation noise, machinery noise, industrial noise, urban noise, sonic boom; Theory and devices for control; Biological and ecological effects; Noise detection; Building technology; Laws, legislation, and regulations; Public administration; Land use.

See also 41I, 43F, 91A, 46A, 57, 85, 89, 94D, and 97R.

For effects on human health, use 68G.

68C-Solid Wastes Pollution & Control

Pollution by solid wastes including garbage, scrap, junked automobiles, spoil, sludge, containers; Disposal methods such as composts or land application, injection wells, incineration, sanitary landfills; Mining wastes; Processing for separation and materials recovery; Solid waste utilization; Recycling; Biological and ecological effects; Superfund (Records of Decision, etc.); SITE technology; Laws, legislation, and regulations; Public administration; Economics; Land use. Includes disposal of concentrated or pure liquids such as brines, oils, chemicals, and hazardous materials.

See also 43F, 91A, 57, 99B, and 97R.

For effects on human health, use 68G.

For the disposal of pesticides and radioactive contaminants, use 68E and 68F.

For the controlled disposal of radioactive wastes from nuclear reactors, use 77G.

68D-Water Pollution & Control

Pollution by municipal wastes, agricultural wastes, industrial wastes, mine wastes, radioactive contaminants; Chemistry and analysis of pollutants; Thermal pollution; Oil pollution; Control techniques and equipment; Sewage treatment; Industrial waste water pretreatment; Hydrology and limnology; Biological and ecological effects; Waste water reuse; Laws, legislation, and regulations; Public administration; Economics; Land use.

See also 43F, 91A, 47, 48G, 57, 97R, 98, 99A, and 99B.

For effects on human health, use 68G.

For pollution by pesticides and radioactive contaminants, use 68E and 68F respectively.

For the design and construction of sewers, and drinking water treatment, use 50B.

68E-Pesticides Pollution & Control

Pollution by insecticides, herbicides, fungicides, rodenticides; Residues; Decomposition studies; Analysis and detection; Soil chemistry and biology; Adverse biological effects; Ecology; Laws, legislation, and regulations; Public administration; Economics.

See also 57, 68A, 68C, 68D, 43F, 91A, 98, and 99A.

For effects on human health, use 68G.

68F-Radiation Pollution & Control

Involves pollution of the environment by particle and electromagnetic radiation from natural and synthetic sources, including neutrons, X-rays, ultraviolet radiation, microwaves, alpha particles; Radon; Sampling and analytical techniques; Fallout; Biological and ecological effects; Laws, legislation, and regulations; Public administration; Economics.

See also 57, 68A, 68C, 68D, 91A, 97R.

For effects on human health, use 68G.

For the controlled disposal of radioactive wastes from nuclear reactors, use 77G.

68G-Environmental Health & Safety

Effects of pollution on public health and safety; Toxicology; Industrial health; Physiology; Psychology; Clinical medicine; Radiobiology; Animals used as research experimental models.

See also 41I, 57, 44G, 68A, 68B, 68C, 68D, 91A, 43F, 94D, and 97R.

68H-Environmental Impact Statements

Only actual draft and final statements are posted in this subcategory. Environmental impact statements describing national effects are posted here and to other appropriate subcategories.

For studies about environmental impact statements, use 68Gen.

70-Administration & Management

700-General

Organizational structure and organization theory.

70A-Inventory Control

Inventory analysis; Inventory models; Obsolescence; Repair-replacement tradeoffs; Spare parts; Stock level control; Usage prediction; Warehouse automation; Stockpiling.

70B-Management Practice

Theory and concepts of management including record keeping, planning, scheduling, organization, coordination, decision making, policy making; Productivity management; Cost effectiveness; Systems management; Contact management; Management methods (PERT, PPB, etc.); Management games. Applied studies are classified in the application.

For research management, use 70E.

70C-Management Information Systems

Information systems which include data collection, data processing, and information delivery for use in decision making an evaluation by managers; Manual and automated systems.

See also 88B.

70D-Personnel Management, Labor Relations & Manpower Studies

Selection, recruitment, management, utilization, and evaluation of personnel; Job descriptions; Job analysis; Salary administration; Labor supply; Labor unions; Arbitration and bargaining; Industrial relations; Fringe benefits, and incentives; Manpower allocation requirements and utilization.

For library and information science personnel, use 88D. For health personnel, use 44P.

70E-Research Program Administration & Technology Transfer

Research management, development, and forecasting; Research contract management; Research needs; Technology transfer and forecasting. Excludes research methods per se. Studies of specific programs are excluded unless they discuss a program at the national level, technology innovation, or trends and impacts of new technology.

70F-Public Administration & Government

National, state, and local government structure, operation, and administration. Operations of government agencies and their interactions; Intergovernmental relations.

See also 43, 91G, and 91H.

70G-Productivity

Productivity of businesses, government, employees, management, and services; Improving quality of work life; Measurement of productivity efficiency and effectiveness; Employee attitudes and motivation, manpower utilization and performance improvement, job satisfaction, job security; Labor-management cooperation, joint committees participative management, job redesign; Alternative work schedules; Incentive plans. Productivity barriers including regulations, obsolete practices, paperwork, and financing methods.

See also 70B, 70D, 70F, 96A, and 96G.

For specific applications of productivity to manufacturing, use 41D and 94.

71-Materials Sciences

710-General

Advanced materials.

See also 41K.

71A-Ablative Materials & Ablation

Physical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Ablation processes and chemistry; Reentry vehicle heat shields.

For production planning, use 41 and 94.

71B-Adhesives & Sealants

Adhesives; Glues; Binders; Sealants; Seals; Gaskets; Physical, mechanical, and structural properties; Performance; Fabrication and manufacturing; Equipment directly related to processing.

See also 71L and 94G.

For concrete cements, use 50C and 89G.

For propellant binders, use 79A and 81H.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71C-Carbon & Graphite

Carbon and graphite fibers and textiles; Charcoal; Carbon black; Carbon and graphite coatings; Industrial diamonds; Physical, mechanical, and structural properties; Performance, fabrication and manufacturing methods; Equipment directly related to processing.

See also 71A, 71E, 71F, 71I, 71L, and 94G.

For carbon and graphite composites, use 71F.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71D-Ceramics, Refractories, & Glass

Glasses; Brick; Porcelain; Ceramic coatings; Ceramic fibers; Physical, mechanical, and structural properties; Performance; Fabrication and manufacturing; Equipment directly related to processing; Studies of individual structural members; Cement properties.

See also 71E, 71I, 71L, and 94G.

For concrete and cement used as building materials, use 50C and 89G.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71E-Coatings, Colorants, & Finishes

Paints and primers; Varnishes; Corrosion resistant coatings; Coating pigments; Carbon, ceramic, plastic, rubber and metal coatings; Physical, mechanical and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Electroplating; Electrodeposition; Flame and plasma spraying; Vapor deposition.

See also 71G, 71L, and 94G.

For surface treatment not involved with coatings, use 94G.

For dielectric and semiconducting films, use 46 and 49.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71F-Composite Materials

Materials composed of two or more physically distinct constituents; Reinforced plastics, graphite or carbon composites; Laminates; Metal matrix composites; Fiber and particulate composites; Physical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 71L and 94G.

For wood composites, use 71R.

For concrete and reinforced concrete, use 50C and 89G.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71G-Corrosion & Corrosion Inhibition

Unwanted chemical reaction effects on metals; Corrosion of metals; Rusting; Corrosion inhibitors; Corrosion resistant coatings; Corrosion electrochemistry.

See also 71E and 71L.

For concrete corrosion, use 50C and 89G.

71H-Elastomers

Rubbers; Additives; Curing agents; Elastomer polymerization; Physical, chemical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 71E, 71I, 71L, 94G, and 99C.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71I-Fibers & Textiles

Glass, carbon, ceramic, metal, and polymeric fibers; Threads, yarns, textile, and fiber finishing, including dyeing and sizing; Physical, chemical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members; Flame resistance.

See also 71L and 94G.

For fiber composites, use 71F.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71J-Iron & Iron Alloys

Includes steels or alloys containing more than 50% iron. Coatings; Fibers; Extractive metallurgy; Refining; Embrittlement; Physical, mechanical, and structural properties; Microstructure; Phase studies; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 71E, 71I, and 71L.

For corrosion, use 71G.

For beneficiation, use 48A.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71K-Lubricants & Hydraulic Fluids

Solid and liquid lubricants; Additives; Greases; Drilling fluids; Brake fluids; Physical, chemical, mechanical and structural properties; Performance; Manufacturing; Equipment directly related to processing; Chemical synthesis.

See also 71L and 41L.

For pollution studies, use 68. For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71L-Materials Degradation & Fouling

Aging; Erosion and cavitation erosion; Wear; Weathering; Decay; Effects of radiation on materials; Biodeterioration, including fungus deterioration.

See also 71C, 71D, 71F, 71H, 71I, 71J, 71K, 71N, and 71R.

For nuclear reactor materials degradation, see also 77I or 77J. If concerned with nuclear propulsion, use 81I.

71M-Miscellaneous Materials

Materials not included in another group, including leather, fur, refrigerants, and waxes; Physical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 94G.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71N-Nonferrous Metals & Alloys

Includes studies not specifying the type of metal. Coatings; Fibers; Extractive metallurgy; Refining; Embrittlement; Physical, mechanical, and structural properties; Microstructure; Phase studies; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; studies of individual structural members.

See also 71E, 71I, and 71L.

For metal fabrication, use 94G.

For corrosion, use 71G.

For beneficiation, use 48A.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71O-Plastics

Additives; Curing agents; Plastic coatings; Plastic polymerization; Physical, chemical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 71E, 71L, 94G, and 99C.

For plastic composites, use 71F.

For polymeric fibers, use 71I.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71P-Refractory Metals & Alloys

Includes only the following metals and alloys having more than 50% of these metals: iridium, molybdenum, niobium (columbium), osmium, rhenium, tantalum, and tungsten. Coatings; Fibers; Extractive metallurgy; Refining; Embrittlement; Physical, mechanical, and structural properties; Microstructure; Phase studies; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 71E, 71I, and 71L.

For metal fabrication, use 94G.

For corrosion, use 71G.

For beneficiation, use 48A.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71Q-Solvents, Cleaners, & Abrasives

Cleaning compositions; Solvents; Detergents; Soaps and abrasives; Cleaning action of these materials; Physical and chemical properties; Performance; Manufacturing; Equipment directly related to processing.

For cleaning techniques, use 94G.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

71R-Wood & Paper Products

Sawing and milling; Lumbering; Plywood, particle and fiber board; Wood product fabrication; Pulping, papermaking, and conversion processes; Physical, chemical, mechanical, and structural properties; Performance; Fabrication and manufacturing methods; Equipment directly related to processing; Studies of individual structural members.

See also 94G.

For forestry and tree production, use 48D.

For pollution studies, use 68.

For industry economics and marketing, use 96.

For production planning, use 41 and 94.

72-Mathematical Sciences

720-General

72B-Algebra, Analysis, Geometry, & Mathematical Logic

Algebra and number theory, including field theory (algebra), group theory, ring theory; Analysis, including calculus of variations, complex variables, differential equations, Fourier analysis, functional analysis, functions (mathematics), measure, and integration; Geometry, tensor analysis, and topology; Mathematical logic, including foundations of mathematics, lattices (mathematics), metamathematics, and set theory.

For applications of mathematics, see the appropriate category of application.

72E-Operations Research

Game theory; Queueing theory; Management games; Mathematical models; Mathematical programming, Network flows; Search theory.

See also Managerial practice, 70B.

For operations research applied to a specific application, see the field of application.

72F-Statistical Analysis

Analysis of variance; Correlations techniques; Discriminate analysis; Distribution theory; Experimental design; Factor analysis; Nonparametric statistics; Probability theory; Regression analysis; Statistical decision theory; Statistical inference; Statistical tests; Stochastic processes.

For statistical analysis applied to a specific application, see the field of application.

74-Military Sciences

740-General

74A-Antiaircraft Defense Systems

Tactical and terminal countermeasures against attacking aircraft that includes tracking and computing equipment, antiaircraft guns, rockets, and missiles.

For specific missiles and rockets, use 75.

74B-Antimissile Defense Systems

Point and terminal defense and countermeasures against air-, surface-, or underwater-launched missiles, bombardment satellites. Includes land based and shipborne tracking and computing systems; Strategic Defense Initiatives (SDI), Star Wars; ballistic missile defense.

74C-Antisubmarine Warfare

Operations conducted against submarines, their supporting forces and operating bases. Include air, surface, and underwater operations.

See also 63.

74D-Chemical, Biological, & Radiological Warfare

Design, development, and utilization of chemical, biological, and radiological weapons; Production, generation, and stability of lethal and nonlethal agents; Biological agents including anticrop and defoliating agents.

For nuclear weapons, use 74H.

74E-Logistics, Military Facilities, & Supplies

Procurement, storage, distribution, issue, repair, replacement of military equipment; Deployment of troops and cargo; Industrial mobilization; stock level controls and inventory techniques; Defense conversion; Downsizing; Base closures; Force reduction; Dual Use Technology; Continuous Acquisition and Life-cycle Support (CALS), formerly Computer Aided Acquisition and Logistics Support.

For related civilian studies, use 70 and 94.

74F-Military Intelligence

Techniques for collecting, evaluating, and disseminating information concerning foreign nations. Includes damage assessment; Surveillance and reconnaissance systems.

74G-Military Operations, Strategy, & Tactics

Joint and combined operations, campaigns, battles, invasions, theater operations; Planning analysis, appraisal, and threat evaluation; Methods of attack and support; Armed Forces maneuvers; Limited and unconventional warfare; Sabotage, insurgency, and counterinsurgency; Guerrilla warfare; Psychological and cold warfare.

74H-Nuclear Warfare

Design, development, and applications of nuclear weapons and devices; Studies of the physical effects of nuclear weapons; Arms control.

For nuclear guided missile warheads, use 75F.

74I-Passive Defense Systems

Systems, structures, and devices to provide area monitoring security and denial. Includes camouflage, barbed wire, minefields, warning systems, barriers, and other anti-intrusion devices.

For civil defense, see also 91I.

For personnel detection, see also 63G.

75-Missile Technology

750-General

75A-Air & Space-Launched Missiles

Design, construction and performance of missiles launched from aircraft or spacecraft.

75B-Missile Guidance & Control Systems

Techniques for guidance and control of missiles from launching to impact. Includes optical guidance, television guidance, wire guidance, preset and terminal guidance, inertial guidance, command guidance, and homing guidance.

75C-Missile Launching & Support Systems

Missile handling and launching. Includes transportation, storage, and preparation for launching; Air, space, surface, and underwater launching and support equipment and techniques; Checkout equipment and procedures; Guided missile ranges.

75D-Missile Tracking Systems

Techniques and systems for tracking missiles as defensive measures. Can be from surface installations or air and spaceborne platforms.

For antimissile defense systems, use 74B.

75E-Missile Trajectories & Reentry Dynamics

Determination, analysis, and processing of missile trajectory data; Flight path analysis; Impact prediction; Atmospheric reentry. Includes aerodynamic studies.

For spacecraft reentry, use 84D.

75F-Missile Warheads & Fuses

Design and performance of all types of missile warheads and fuzes-chemical, biological, nuclear and explosive.

For rockets, use 79H.

75G-Surface-Launched Missiles

Design, construction, and performance of missiles launched from the ground, surface platforms, vehicles, silos, and surface ships.

75H-Underwater-Launched Missiles

Design, construction, and performance of missiles launched from underwater.

76-Navigation, Guidance, & Control

760-General

76A-Control Devices & Equipment

Navigation and guidance control equipment.

See also 76C.

76B-Guidance Systems

Design, development, and performance of complete guidance systems. Includes integration of specific components and subsystems necessary to assure course positioning.

76C-Navigation & Guidance System Components

Navigation computers; Gyros, radiators, sensors, indicators, etc., used in navigation of aircraft, ships, spacecraft, and ground vehicles.

76D-Navigation Systems

Design, development, and performance of complete navigation systems; Integration of specific components and subsystems necessary in direction finding (position, distance, and course of travel); Global navigation systems.

See also 85F.

77-Nuclear Science & Technology

770-General

Includes nuclear materials management, safeguards, accounting methods.

See also 77I.

77A-Fusion Devices (Thermonuclear)

Theory, design, construction, and operation of devices for producing controlled thermonuclear fusion reactions; Nuclear fusion reactor materials and fuels.

For plasma studies in thermonuclear devices, see also 46G.

77B-Isotopes

Identification, separation, and concentration of radioactive isotopes. Includes isotopic irradiation devices.

For radioactive isotopes polluting the environment, use 68F.

For the use of isotopes in labeling chemical reactions, use 99F.

For the use of isotopes in medical/biological applications, use 57.

77C-Nuclear Auxiliary Power Systems

SNAP technology, both isotopic and reactor; Isotopic power supplies; Small scale electricity generation by nuclear means.

For nuclear propulsion, see the field of application.

77D-Nuclear Explosions & Devices

Explosion effects, including shock waves, ground motion, electromagnetic pulses, primary radiation, injection of charged particles into radiation belts; Testing of nuclear devices (including nuclear simulation using chemical explosives); Peaceful applications (e.g., Plowshare).

For effects on communications and electronics systems, see the field of application.

For military applications, use 74H.

77E-Nuclear Instrumentation

Nuclear radiation detection and measurement devices and systems; Beta particle detectors.

For X-ray detectors, use 46Gen.

For health physics instrumentation, use 57V.

77F-Radiation Shielding, Protection, & Safety

Shielding design, nuclear radiation transport properties of materials, decontamination; Container design and transportation requirements for radioactive materials; Fallout shelters.

See also 91I.

77G-Radioactive Wastes & Radioactivity

Separation, processing, handling, storage, disposal, and reuse of radioactive wastes; Radioactive fallout; Fission products; Man-made or natural radioactivity; Decommissioning.

For radiation pollution, use 68F.

77H-Reactor Engineering & Nuclear Power Plants

Engineering related directly to the design, safety, and operation of a reactor; Research and test reactors. Integrated assemblage, including reactor and turbogenerator equipment, plus control and regulatory devices of a nuclear power plant, either mobile or stationary; Includes site selection and feasibility studies; Engineering aspects of reactor accidents.

See also 77C.

For critical assemblies and reactor simulation, use 77K.

77I-Reactor Fuels & Fuel Processing

Production, testing, design, or reclamation of nuclear fuel materials, reactor fuel elements (includes cladding) and fuel assemblies. Includes nuclear fuel

cycle studies for nuclear materials management; Nuclear fuel reprocessing.

For processing of nonrecoverable fuel materials and fuel contaminants, use 77G.

77J-Reactor Materials

Production, testing, design, or reclamation of coolants, control materials, moderators, structural materials such as pipe materials; Shielding materials, and steels. Includes fabricated elements or assemblies and specific configurations.

For the effects of radiation on materials, see also 71L or 71J.

For fuel materials, cladding, or fuel assemblies, use 77I. Excludes power generating equipment and nuclear fusion reactor materials.

77K-Reactor Physics

Reactor kinetics, reactor theory, neutron transport theory, and criticality. Includes critical assemblies and reactor simulators.

79-Ordnance

790-General

79A-Ammunition, Explosives, & Pyrotechnics

Projectiles, fuzes, demolition explosives, detonators, grenades, land mines, high explosives, primers, powder and liquid propellants, flame throwers, and equipment for handling these items; Production, performance, storage stability of incendiaries, pyrotechnics, screening agents (smokes), etc.

For nuclear weapons, use 74H.

For rocket propellants, use 81.

79B-Armor

Design, testing, and performance of armor and armor plate including bullet proof, flak proof, explosion proof, and fragment proof devices and related equipment.

For other types of protective devices, see the application.

79C-Bombs

High-explosive, fragmentation, antipersonnel, armor piercing, incendiary, napalm, general purpose, and similar types of bombs; Bomb handling equipment; Storage.

For bomb directors and bomb release mechanisms, use 79F; For nuclear bombs, use 74H.

79D-Combat Vehicles

Military vehicles including armored wheeled and track-laying vehicles, tanks and reconnaissance vehicles, trucks, gun carriers; Components and accessories.

79E-Detonations, Explosion Effects, & Ballistics

Explosion effects (except nuclear) such as blast, shock waves, detonation waves, cratering, earth motion or movement, heat, etc.; Interior, exterior, and terminal ballistics; The study of motion, behavior, and aerodynamics of projectiles thrown or launched by ordnance projectors; Includes target vulnerability and damage assessment studies, weapons effects.

For nuclear explosion effects, use 77D.

79F-Fire Control & Bombing Systems

Fire control computers, sights, directors, range finders, gunlaying, bombing radar systems, boresighting, bomb releases, and other devices used specifically for directing the firing of weapons or the dropping of bombs.

79G-Guns

Small arms, automatic weapons, antipersonnel weapons, recoiless weapons, mortars, artillery and naval guns, their accessories and components; Gun carriages, gun mounts, remote control equipment, etc.

For ballistic studies, use 79E.

For gun control, social violence, use 92C or 43.

79H-Rockets

Unguided, self-propelled projectiles whose trajectory or course cannot be altered after launch; Ground launched, air launched, or ship launched rockets, launchers, and launch support equipment.

For sounding rockets, use 55D.

79I-Underwater Ordnance

Torpedoes, submarine mines, depth charges, hydrobombs, antisubmarine ammunition, etc.; Launching devices and support equipment.

81-Combustion, Engines, & Propellants

810-General

81A-Combustion & Ignition

Autoignition, ignition, and combustion. Includes flame studies; Combustion products studies; Ignition systems; Combustion chemistry; Flammability studies.

See also 89 and 94H.

81B-Electric & Ion Propulsion

All types of engines deriving power from free ions and electrons. Includes ion, plasma, and arc jet systems; Propulsion by means of solar wind; Laser propulsion.

For electrically propelled surface vehicles, use 85.

81C-Fuel & Propellant Tanks

Design, performance, and testing of fuel and propellant tanks including those for automobiles, petroleum products, and rocket propellants.

81D-Jet & Gas Turbine Engines

Design, performance, and testing of all types of jet and gas turbine engines, their components, engine nozzles. Includes Ramjet, Scramjet, and Turbofan engines, and hydroduct and turbomachinery as well as nonpropulsive turbines.

See also 97L and 51C.

81G-Rocket Engines & Motors

Design, performance, and testing of rocket engines and motors and their components.

81H-Rocket Propellants

Production, handling, stability, and performance of liquid, solid, thixotropic, and exotic propellants. Includes fuels, oxidizers, additives, and binders.

For combustion and ignition, use 81A.

81I-Nuclear Propulsion

Design, performance, and testing of nuclear engines for surface, air, and space propulsion.

See also 85.

81J-Reciprocation & Rotating Combustion Engines

Design, performance, and testing of reciprocating and rotating engines of various configurations for all types of propulsion. Includes internal and external combustion engines; Engine exhaust systems; Engine air systems components; Engine structures; Stirling and diesel engines.

See also 97L and 85H.

82-Photography & Recording Devices

820-General

82A-Holography

Techniques, materials, and uses of holography and holograms; Acoustic holography.

See also 46C.

82B-Photographic Techniques & Equipment

Photographic techniques, including aerial photography, color photography, astronomical photography, cinematography, photomicrography, Schlieren photography; Cameras, lenses, shutters, projectors, photographic processes, and materials; Microphotography, Photographic copying; Direct recording and reproduction of visual images; Copying, reproduction and replication techniques; Thermography; Lithography, and related arts; Graphic arts, illustrating, visual design.

For photogrammetry, use 48I.

82C-Recording Devices

Techniques and devices for recording other than visual images. Includes disk, magnetic, thermoplastic, electrostatic recording systems, CD-ROM, and playback equipment such as record players, tape recorders, etc.

84-Space Technology

840-General

Extraterrestial biology, chemistry, and medicine.

84A-Astronautics

Space missions; Projects and logistics; Orbital rendezvous; Space exploration; Spacecraft operating problems; Extravehicular activity.

84B-Extraterrestial Exploration

Space probe exploration; Space landings; Space construction and maintenance; Extravehicular activity on other planets.

84C-Manned Spacecraft

Design and construction of manned spacecraft, space stations, aerospace planes and their components.

84D-Spacecraft Trajectories & Flight Mechanics

Determination, analysis, processing of spacecraft trajectory data; Space mechanics; Orbital calculations; Flight path analysis; Atmosphere entry; Reentry dynamics.

84E-Space Launch Vehicles & Support Equipment

Handling and launching, including transportation, storage, preparation for launching, countdown, launching equipment, checkout equipment, ground support equipment, and information systems; Spacecraft tracking systems; Tracking networks; Recovery support.

84F-Space Safety

Safety measures and devices directed toward reducing the hazards of spaceflight.

84G-Unmanned Spacecraft

Design and construction of unmanned spacecraft, including space probes, scientific satellites, military satellites, communication satellites, reconnaissance satellites, and navigational satellites.

For satellites applied to a specific application, see the field of application.

85-Transportation

850-General

85A-Air Transportation

Operation of systems for transport by air; Civil aviation; Airports and airport access; Airline operations;
Air routing; Air traffic control systems; Multimodal systems; Aviation safety and aviation accidents; Aircraft fires; Aircraft fuel fires.

See also 43G, 74E, 76, 85D, and 91B.

For design of aircraft and components, use 51 and 81.

For runway construction and design, use 50B.

85C-Metropolitan Rail Transportation

Urban rail transit; Underground and above-ground rapid transit railways, including subways; Automated guideway transit systems; Tracked air cushion vehicles.

See also 85I and 91B.

85D-Transportation Safety

Safety and accidents involving air, land, and water transportation; Accident studies and prevention; Alcohol related studies; Breakaway barriers and structures; Standards and testing of components and equipment; Crashworthiness; Traffic safety; Collision research; Safety equipment and devices.

See also 91B.

For pipeline accidents, use 85E.

85E-Pipeline Transportation

Transportation of liquids, gases, and slurries throughlong-distance pipelines; Accidents and safety.

85F-Global Navigation Systems

Worldwide navigational aids to transportation; Global positioning system (GPS).

See also 76D.

85G-Marine & Waterway Transportation

Shipping; Safety and accidents; Safety equipment; Cargo handling and equipment; Cargo movement; Passenger movement; Traffic control; Boating; Trade routes; Shipborne containerization.

See also 43G, 74E, 76, and 85D.

For marine engineering, use 47A.

For waterway engineering, use 50B.

85H-Road Transportation

Passenger and cargo movement; Design and standards for vehicles and components; Motor vehicle engine studies; Safety engineering; Safety devices; Traffic and road safety; Collision research; Accident studies; Highway traffic; Traffic engineering; Passenger and cargo vehicles; Trailers; Motorcycles; Bicycles and bikeways; Hiking trails.

See also 43G, 50A, 74E, 81J, 85D, and 91B.

85I-Railroad Transportation

Safety and accidents; Safety equipment; Cargo handling and equipment; Cargo movement; Passenger movement; Traffic control; Terminals; Amtrak; Track studies; Rolling stock; Scheduling; Railroad engineering and equipment.

See also 43G, 85D, and 91B.

88-Library & Information Sciences

880-General

Includes general studies about microforms; Film readers; Copyrights; Privacy Act; Report writing.

88A-Operations & Planning

Acquisitions, classification, cataloging, abstracting, and indexing; Circulation and reference systems; Information services; Interlibrary loans; Distribution; Manual and computerized information retrieval; Individual libraries and information center.

For library or information networks, use 88B.

88B-Information Systems

Library and information networks; Operations and planning of these systems; File maintenance and management; Database management; Information superhighway, National Information Infrastructure; Applied information systems (Management, medical, transportation, etc.) See also 44T, 62, and 70C.

For database management, use 62B.

For communications and computer networks, use 45C.

For geographic information systems, see 48I.

88C-Marketing & User Services

User needs, surveys; Promotions; Fees.

88D-Personnel

Training and education; Selection; Management; Performance; Schools and accreditation.

See also 70D.

88E-Reference Materials

Bibliographies; Directories; Glossaries; Catalogs; Thesauri; Indexes; Abstract and title periodicals.

89-Building Industry Technology

Includes fires in buildings.

890-General

Includes fires in buildings.

89B-Architectural Design & Environmental Engineering

Architecture; Human engineering; Site surveys; Interior design; Lighting; Heating, ventilating, and air conditioning; Heat loss studies. Includes environmental engineering equipment.

See also 97J and 94E.

89C-Construction Management & Techniques

Excavation; Fabrication (presite and onsite); Construction techniques; Reconstruction; Management including planning, manpower, and labor studies.

89D-Structural Analyses

Dynamics and statics of structures and structural members including kinetics, kinematics, vibration and stress analyses; Induced environmental stresses including earthquakes, wind, and flood; Foundation stresses; Soil-structure interactions.

89E-Building Standards & Codes

Standards and codes for buildings, equipment, components, and materials.

89G-Construction Materials, Components, & Equipment

Plumbing; Wiring; Insulation; Doors and windows; Walls; Joints; Beams; Construction equipment such as bulldozers and cranes. Includes flammability and fire studies. Cement and concrete.

See also 50C.

For cement properties, see also 71D.

89H-Building Equipment, Furnishings, & Maintenance

Equipment including security alarms (i.e. Burglar alarms), elevators, and fire safety devices; Furnishings, including major household appliances, rugs, and furniture; Maintenance, including repair, pest control, and cleaning.

For environmental engineering equipment, use 89B.

90-Government Inventions for Licensing

For patents and patent applications only (will be labeled as such in the report title); Not for bibliographies.

900-General

Computer software.

90A-Mechanical Devices & Equipment

Devices and equipment for fuel ignition; Heating, illumination, and refrigeration; Cleaning; Printing; Product handling and transportation; Sprinklers; Fire extinguishers; Safety; Motor and other land vehicles; Earthworking and excavating; Tools; Jacks; Hydraulic and pneumatic systems; Power transmissions; Couplings, fasteners, and joints; Piping; Drilling and mining; Separators; Locks; Sewing machines; Winding and reeling; etc.

For metal shaping and forming, use 90E.

For medical equipment, use 90D.

90B-Chemistry

Organic and inorganic compounds; Batteries; Electrochemistry; Hydrocarbons; Lubricating compositions; Propellents and rocket fuels; Acids; Polymers; Plastics; Inks; Bleaching; Dyeing; Fertilizers; Food fermentation; Sugar and starch; Paper making; Textiles; Paints; Coatings (except metal coatings); Chemical reactors; etc.

90C-Nuclear Technology

Reactors; Radioactive materials; Nuclear instrumentation; Nuclear radiation safety; Nuclear power plants and reactor engineering; Nuclear fusion; Particle accelerators; Plasma devices; etc.

90D-Biology & Medicine

Drugs; Cosmetics; Prosthetics; Medical equipment; Pesticide biology; Biological laboratory equipment; Life support equipment.

90E-Metallurgy

Metal stock; Metal coatings; Molding, shaping, and treating processes; Laminating; Glasses; Material shaping; Sheet metal and wire working; Bonding and joining; Cutlery; etc.

For use of mechanical equipment, use 90A.

90F-Electrotechnology

Antennas, circuits, and electromechanical devices; Electron tubes; Optoelectronic devices; Power and signal transmission devices; Resistive, capacitive and inductive components; Semiconductor devices; Information transmission, storage, and retrieval; Communications; etc.

90G-Instruments

Photographic equipment; Measuring and testing instruments and equipments; Acoustic devices; Etc.

For nuclear instruments, use 90C.

90H-Optics & Lasers

Optical materials, components, equipment, and systems; Infrared, visible, ultraviolet, and X-ray lasers; Masers.

90I-Ordnance

Production and performance of projectiles, fuzes, explosive materials, pyrotechnics, and weapon systems (not limited to military applications); Ordnance storage systems; Fire control systems; Weapons delivery systems; Missiles, rockets, and propellants directly related thereto; Weapons carriers (tanks, aircraft ships, etc); Guns; Laser weapons; Bombs.

90J-Food Technology

Pasteurizing, curing, canning, dehydrating, freezing, irradiation, freeze drying, etc., of foods and other agricultural products; Sanitation and fumigation of products; Food additives and preservatives; Analysis and inspection of products; Storage, packaging,
and display of products; Cooking devices.

For food fermentation, use 90B.

91-Urban & Regional Technology & Development

910-General

Includes energy studies.

91A-Environmental Management & Planning

Air, water, noise, and waste management and control; Monitoring services; Solid wastes and recycling;
Solid waste landfills; Water quality management; Environmental surveys; Design and operation of sewer systems (combined, etc.); Water supplies and services; Excludes natural resource management.

See also 68 and 43F.

91B-Transportation & Traffic Planning

Planning for modes of public and private, passenger and cargo transporation; Travel patterns and demand; Parking; Traffic engineering, traffic flow and control; Traffic surveys; Highway and street services; Rapid transit systems; Passenger transportation and planning; Pedestrian movement.

See also 43G and 85.

91C-Fire Services, Law Enforcement, & Criminal Justice

Fire, police, and court services and their administration; Law enforcement and criminal justice; Crime and fire prevention; Personnel recruitment, training, and utilization; Parole; Work release; Correctional institutions.

See also 43D.

For criminal justice and corrections, see also 43Gen.

91D-Communications

Use and planning of communications; Mass media, emergency communications, public information.

See also 45.

91E-Housing

Surveys and assessments of existing housing; Planning and development; Building codes; Housing needs; Housing renovation; Public housing.

For design, architectural, or construction related studies, see also 89.

91F-Health Services

Urban health services; Emergency medical services; Mental health services; Nursing homes; Ambulatory health services; Hospital services; Public health access.

See also 43C, 43D, 44 and 91I.

91G-Urban Administration & Planning

General administration and planning; Feasibility studies; Appraisal of real property; Taxation; Land use and zoning; Urban revitalization; Financing.

See also 43 and 70F.

91H-Regional Administration & Planning

General administration and planning for county and regional areas that may also contain urban or urbanized areas; Intergovernmental relations and interactions (State, County, Local); Land use and zoning.

See also 43 and 70F.

For state government administration and planning, use 43.

91I-Emergency Services & Planning

Disaster services; Civil defense; Early warning systems and emergency preparedness for all types of disaster; Emergency weather services; Pollution alerts; Civil disturbances; Ambulance services; Flooding; Disaster relief.

See also 43D, 44, and 91F.

For military passive defense systems, see also 74I.

For personnel detection, see also 63G.

91J-Economic Studies

Economic analyses; Economic development; Industrial development; Economic impacts of development; Population-economy-income studies; Employment and earnings; Property values; Commercial area studies.

See also 43B and 96.

For government financial operations, use 43A, 70F, 91G, and 91H.

91K-Social Services

Child care; Family and youth counseling; Social rehabilitation; Foster homes and adoption; Welfare and public assistance; Financial assistance; Food stamp services; Employment services; Legal services.

See also 43C, 91F, and 92C.

91L-Recreation

Planning and administration; Facilities; Public opinion; Economic and social aspects; Safety aspects; Use of recreational vehicles; Cultural activities; Sports; Parks, including national parks.

92-Behavior & Society

920-General

Includes general overall census studies; Political science.

92A-Job Training & Career Development

Vocational training; On-the-job training; Retraining; Vocational rehabilitation; Use and design of training simulators (including flight simulators) and equipment; Instructional aids; Professional development; Career development.

For curriculum development, use 92D.

92B-Psychology

Human behavior; Personality; Intelligence; Learning ability; Judgement; Motivation; Perception; Job satisfaction; Leadership characteristics; Psychometrics; Adaptability; Social, industrial, group, organizational, interpersonal, and experimental psychology; Clinical psychology; Physiological psychology.

For the measurement of hearing, vision, heart rate, respiration and other physiological responses as related to behavior, use 57T or 57W.

92C-Social Concerns

Sociology and sociometrics; Race relations; Age group and minority group studies; Social rehabilitation of drug abusers, alcoholics, physically, emotionally, and mentally handicapped, offenders, etc.; Cultural and economic deprivation; Social discrimination; Immigration; Demography; Social services, including child care, welfare, counseling, financial assistance, and employment and unemployment services; Attitude studies.

See also 43C, 44, and 91K.

92D-Education, Law, & Humanities

Formal education; School systems; Educational administration; Curricula; Instructional devices and materials, including audiovisual; Teaching methods; Computer-assisted instruction; Laws; Linguistics; Machine translation; Fine arts; Archaeology; History; Anthropology; Humanities; Religion.

92E-International Relations

Political and social indicators; Crises and crisis management; Conflict analysis; Foreign aid; Foreign policy and foreign affairs; International political science; Disarmament and arms control; Espionage; Includes international relationships concerning territorial seas, fishing, extradition, and natural resources.

See also 74H.

For international commerce, use 96C.

94-Industrial & Mechanical Engineering

940-General

Includes bearings; Mechanical elements; Pipes; Tubes; Levers; Cams; Springs; Mechanical joints; Containers and packing materials; Refrigeration systems and equipment; Industrial furnaces and boilers; Heat exchangers; Heat pumps; Heat pipes; Industrial security; Metrology.

For rocket engine components, use 81G; For fuel tanks, use 81C; For cooling towers, use 97J; For nuclear security, use 77Gen.

94A-Production Planning & Process Controls

Materials control; Numerical control and automation; Time and motion studies ; Scheduling; Production controls and programming; Modeling techniques and program controls; Inventory management.

See also 44A, 41A and 41B.

94B-Quality Control & Reliability

Tolerances allocations; Maintainability requirements; Probability of satisfactory performance of components and equipment; Inspection methods; Destructive industrial testing; Reliability theory; Quality assurance.

See also 41E and 41G.

94C-Plant Design & Maintenance

Site selection; Plant design; Layout; Maintenance management; Scheduled, routine, and corrective maintenance.

See also 41H.

94D-Job Environment

Industrial hygiene and occupational diseases and injuries in settings such as factories, and office and commercial buildings; Industrial psychology; Industrial sociology; Workplace layout and design; Worker interactions.

See also 44G, 57U, 41I, and 92B.

For industrial safety engineering and accident prevention, use 94H.

94E-Environmental Engineering

Lighting; Heating; Ventilating; Air conditioning. Includes environmental engineering equipment related to industrial use. Excludes pollution control.

See also 41I, 89B and 97J.

94F-Tooling, Machinery, & Tools

Machine subassemblies; Robots; Robotics; Tools; Machinery, including hoists, conveyors and pumps.

See also 41C and 41J.

94G-Manufacturing Processes & Materials Handling

Fabrication, assembling, cleaning, and finishing; Industrial and manufacturing processes (limited to in-depth studies that directly discuss specific processes); Bonding and joining, including gluing, welding, soldering, and brazing; Materials forming and machining; Heat treatment; Coating processes; Materials handling, including palletizing, conveying, warehousing, storing, containerization, and packaging.

See also 71, 41B, 41E, and 41F.

For processing and packaging of food, use 98H.

For production of materials, use 71.

For chemical engineering and processing, use 99B.

For the beneficiation and processing of minerals, use 48A.

94H-Industrial Safety Engineering

Accident prevention; Safety measures; Fire prevention; Warning systems; Safety equipment, structures, and clothing.

For industrial safety engineering applied to a specific application, use the field of application.

94I-Hydraulic & Pneumatic Equipment

Design, production, performance, and testing of hydraulic and pneumatic systems, accumulators, actuators, compressors, and distribution equipment; Fluidic and flueric devices.

See also 41J.

For hydraulic fluids, see 71K.

94J-Nondestructive Testing

Nondestructive testing having industrial application; Ultrasonic, radiographic, hydrostatic, magnetic, and optical nondestructive techniques and equipment; Nondestructive testing of flaws, thickness, opacity, strength.

For destructive industrial testing, use 94B.

94K-Laboratory & Test Facility Design & Operation

Measuring, testing, and simulation devices. Includes laboratories, test facilities, and test equipment measuring testing and simulation. If the test facility, equipment, etc. is applied to a specific application, use the field of application.

95-Biomedical Technology & Human Factors Engineering

950-General

95A-Prosthetics & Mechanical Organs

Includes materials and equipment going into human bodies, enabling them to function properly, either temporarily or permanently. Artificial limbs and limb braces; Facial prosthetics, including artificial eyes; Dental prosthetics; Mechanical organs and mechanical hearts; Circulatory assist devices; Artificial kidneys, etc.; Biocompatible materials including tissue adhesives, tissue compatible materials, and antithrombogenic materials.

For prosthodontics, use 57G.

95B-Tissue Preservation & Storage

Preservation of organs, tissue, and blood for transplantation or transfusion to living organs;
Blood and tissue banks; Properties and evaluation of preserved and stored materials.

See also 57J, 57S, and 57X.

95C-Biomedical Instrumentation & Bioengineering

Includes materials and equipment used to monitor human body functions. Design, use, and performance of biomedical equipment; Biotelemetry including biotelemetry transducer and transmitter equipment; Hospital equipment and supplies; Dental materials and equipment; Equipment for physiological monitoring; Diagnostic equipment; Biomedical laboratory equipment.

See also 95A.

95D-Human Factors Engineering

Design of tools, instruments, equipment, and machinery with emphasis on optimum utilization by humans; Habitability of work and living space; Ergonomics; Interaction of man and equipment in terms of subsystem and system performance requirements and evaluation. Encompasses manual controls, tactical kinesthesis, and other human sensory modalities involved in operation of equipment and understanding of personnel subsystems; Man-machine systems. Includes anthropometric studies, protective equipment, protective clothing, and life support systems.

95E-Life Support Systems

Equipment and techniques for sustaining life in foreign environments, such as space, underground, and underwater; Closed ecological systems (includes pressure suits, diving gear, and breathing apparatus).

See also 95D.

95F-Bionics & Artificial Intelligence

Study of biological processes in order to develop engineering systems; Simulation of biological processes; Comparative studies of control systems formed by the brain and nervous system; Pattern recognition systems based on biological modes; Biological applications of information theory; Cybernetics.

95G-Protective Equipment

Equipment providing protection against such environmental elements as heat, cold, noise, machinery, and radiation.

For equipment and techniques for sustaining life in environments where normal respiration is not possible, use 95E.

96-Business & Economics

960-General

Includes economic theory; Business and economic census studies; Insurance not covered by another subcategory; Small businesses.

96A-Domestic Commerce, Marketing, & Economics

National and state-level studies; Industrial costs and economics; Economic impact of industries; Economic impacts on industries; Industrial statistics; Agricultural economics; Productivity; Labor supply and demand; Labor costs and economics; Inflation; Economic aspects of unemployment; Employment and unemployment statistics; Wage surveys; United States commerce; Wholesale and retail trade; Domestic market surveys; Business, personal, and property taxes; Income tax data; Franchising.

See also 43B, 70D, 91J, and 98B.

For studies of individual plants or operations, see the field of application; For economic impacts of individual plants or operations, see the field of application; For regional development, use 43B and 91J.

96C-International Commerce, Marketing, & Economics

Foreign market surveys and research; International trade; Imports and exports; Customs and tariffs; Multinational businesses; Trends and forecasting.

For international finance, use 96F.

96D-Consumer Affairs

Consumer problems and protection; Truth in advertising; Commercial psychology; Product maintenance and reliability problems; Home appliances safety; Product comparison studies; Flammability studies; Motor vehicle recalls.

96E-Minority Enterprises

Minority owned and operated businesses; Business training of minority groups; Franchising; Equal opportunities in business.

96F-Banking & Finance

Investments; Credit; Banks and trust companies; Mortgage finance; Savings and loan associations; Security and commodity brokerage; Balance of payments; Gold and silver movement; Cash flow; Regulations; International finance.

For government financial operations, use 43A, 70F, 91G, and/or 91H.

96G-Foreign Industry Economic Development

Private and governmental industrial and economic development in foreign countries including industrialized and developing countries; International technology transfer; For foreign market surveys and international trade, use 96C.

96H-Foreign Business & Economics

Foreign and developing countries; Businesses, economic conditions and socioeconomics.

For foreign market surveys and international trade, use 96C.

For social concerns related to economics, see also 92C.

97-Energy

970-General

Includes energy source development.

97A-Reserves

Natural reserves; Fuel stockpiles; Mineral and fossil fuel deposits including coal, uranium, petroleum, natural gas, geothermal, peat, and oil shale; Water power potential; Site studies of wind power potential and solar radiation availability.

For individual mine studies, use 48A.

97B-Energy Use, Supply, & Demand

Electric power and fuel consumption and requirements; Supply and demand; Heat use, supply, and demand.

97E-Electric Power Transmission

Electric power distribution; Electric transmission lines and substations; Electric power pools; Wireless energy transmission.

97F-Fuel Conversion Processes

Methods to convert a fuel to a different chemical form including coal gasification and liquefaction; Upgrading fuels by chemical synthesis.

For petroleum refining, oil shale retorting and refining, use 97K and 99B; For environmental studies, use 97R.

97G-Policies, Regulations & Studies

Energy conservation; Licensing; Legislation; Government policies and regulatory controls; Energy goals; Research needs; Energy management, economics, and financing; Depletion allowances and leasing policies; Rates and energy models; Energy shortages; International issues.

97I-Electric Power Production

Design and operation of electric power plants; Commercial, industrial, and residential electric power production; Site surveys; Large-scale nuclear, hydro, solar, geothermal, and fossil fuel electric power plants; Power plant boilers.

Note: usually restricted to large-scale electric power production.

For small-scale electric power production, use 97N, 97O, or 97P.

For pollution control and environmental impact, use 68 and 97R.

For some nuclear power plant studies, use 77 and 97Q. 97Q should be those that are most pertinent to the use of nuclear technology for energy production.

97J-Heating & Cooling Systems

Design and operation of space heating and cooling systems and equipment; Furnace and boiler studies when related to energy conservation and energy use; Cooling towers; MIUS technology; Total energy systems.

See also 97N.

97K-Fuels

Production, performance, properties, storage, prices, and transportation of all types of solid, liquid, and gaseous fuels; Chemical composition of fuels; Fuel compatibility; Hydrogen production; Refuse derived fuels; Fuel desulfurization; Oil shale retorting; Petroleum refining; Fuel additives; Growing plants for fuels; Bioconversion and biomass plantations.

See also 48D and 97N.

For fuel tanks, use 81C.

For nuclear fuels, use 77I.

For fuel conversion, use 97F.

For rocket fuels, use 81H.

For supply and demand, use 97B.

For oil and gas drilling and recovery, coal mining and other energy related mining studies, use 48A.

97L-Engine Studies (Energy Related)

Operation and design of engines when related to energy conservation and energy use. Covers turbine, rotary, and reciprocating engines.

See also 81.

97M-Batteries & Components

Electrochemical batteries of all types including alkaline cells, dry cells, metal-air batteries, primary cells, reserve batteries, storage batteries, thermal batteries, wet cells; Battery containers, depolarizers, electrodes, electrolytes, separators, and other components and materials; Battery chargers and testers; Battery electrochemistry.

For thermoelectric and thermionic batteries, use 97O.

97N-Solar Energy

Solar collectors, concentrators, and absorbers; Solar cells; Solar cookers, dryers, furnaces, generators; Solar heat engines; Solar heating and cooling systems; Solar power plants; Solar stills; Solar water heaters; Solar heat storage systems; Solar water pumps; Solar sea power plants; Orbital solar power plants; Optical coatings and filters for solar devices; Solar energy policies, use, supply, trends, and economics.

97O-Miscellaneous Energy Conversion & Storage

Fuel cells; Magnetohydrodynamics; Experimental electric generators; Turbogenerators; Heat storage; Compressed air energy storage; Mechanical conversion; Thermoelectric and thermionic conversion; Photovoltaic conversion (excludes solar cells); Wind power; Tidal power; Nuclear fusion power plants.

For commercial, industrial, and residential use of energy conversion and storage devices, use 97I or 97J.

97P-Geothermal Energy

Geothermal exploration and prospecting methods and equipment; Geothermal resources; Geothermal energy conversion; Geology applied to geothermal systems; Drilling; Reservoirs; Extraction; Site selection; Geothermal power plants; Corrosion studies; Materials used in geothermal systems.

97Q-Selected Studies In Nuclear Technology

Reports assigned to this subcategory are selected for their broad interest to users in the nuclear energy field.

For other nuclear energy subcategories, use 77.

97R-Environmental Studies

Air, noise, water, and solid waste pollution and pollution control from energy resource development, fuel production, energy production, and energy use; Environmental impacts of energy production and use.

See also 68.

98-Agriculture & Food

980-General

98A-Agricultural Chemistry

The application of chemistry and chemical analysis to agriculture; Fertilizer production; Soil chemistry; Chemistry of feeding stuffs; Crop chemistry; Biochemical studies.

For food chemistry, use 98H.

98B-Agricultural Economics

Economics conditions, markets, subsidies, and policies affecting agriculture; Farm management and finance; Land and labor economics; Prices and price control.

See also 96C.

98C-Agricultural Equipment, Facilities, & Operations

Agricultural engineering; Agricultural machinery and tools; Seed preservation; Planting, fertilizing, mulching, weeding, and harvesting; Pest and disease control techniques and equipment; Crop protection; Crop drying and storage; Farm water supplies; Irrigation systems; Farm safety; Farm construction and operation.

For pest control, see also 57P.

For food processing, use 98H.

98D-Agronomy, Horticulture, & Plant Pathology

Field crop production; Cultivation of orchards, gardens and nurseries; Plant biology; Plant breeding, propagation, and hybridizing; Hydroponics.

See also 57C.

98E-Animal Husbandry & Veterinary Medicine

Production and care of domestic and wild animals; Breeding, feeding, management, rearing, testing, and training; Pets; Animal pathology; Toxic effects on domestic animals; Animal quarantine; Disease resistance, control and treatment; Breeding, care, and utilization of laboratory animals.

See also 57Z.

98F-Fisheries & Aquaculture

Fishing, fishing equipment, and shipboard processing of fisheries products; Cultivation of fishes, shellfish, and algae in fresh or salt water for commercial or recreational use; Use of fish ladders and weirs; Sport fishing.

See also 47D, 48B, and 57Z.

For fish processing, use 98H.

98G-Agriculture Resource Surveys

Surveys to scan crop yields, soil moisture content, crop diseases, and forest diseases. Includes fishery surveys; Satellite and aerial surveys.

98H-Food Technology

Pasteurizing, curing, canning, dehydrating, freezing, irradiation, freeze drying, etc., of foods and other agricultural products; Sanitation and fumigation of products; Food additives and preservatives; Analysis and inspection of products; Storage, packaging, and display of products; Kitchen and cooking equipment.

For biochemical studies of foods, see also 57B.

99-Chemistry

990-General

99A-Analytical Chemistry

Techniques and instrumentation for the separation and analysis of individual compounds or specific groups or compounds, both inorganic and organic. Includes qualitative, quantitative, volumetric, gravimetric, optical, spectroscopic; electrochemical, ion exchange, chromatographic analysis; Test methods; Forensic chemistry; Data interpretation; Routine analysis or experimental results.

99B-Industrial Chemistry & Chemical Process Engineering

Techniques, processes, unit operations, and plant equipment that apply to chemical manufacturing, processing, transportation, and storage; Petroleum refining; Desalination technology; Pollution control equipment; Process control technology; Process engineering; Chemical reactors.

For coal gasification and liquefaction processes, see also 97F and 97K.

For specific environmental pollution control, see also 68.

For water purification, see also 50B and 68D.

99C-Polymer Chemistry

Synthesis, properties, reactions and theories of polymers and copolymers. Includes all types of polymerization, curing, crosslinking, reaction kinetics, etc.

For mechanical properties of polymers, use 71O and 71H.

99D-Basic & Synthetic Chemistry

Synthesis, properties, and reactions of inorganic and organic compounds; Studies of individual or specific groups of chemical elements; Molecular structure; Stereochemistry.

For chemical reaction mechanisms between atoms, ions, or molecules, see also 99F.

For spectrum analysis of compounds, use 99A and 99F.

99E-Photochemistry & Radiation Chemistry

Studies involving the interrelationships of electromagnetic or particle radiation and chemical reactions; Studies of radioactive elements and their reactions; Radiochemistry; Photochemical reactions.

See also 55A and 68A.

99F-Physical & Theoretical Chemistry

Physical chemistry; Thermodynamics; Thermochemistry; Colloids and gels; Surface chemistry; Catalysis and catalysts; Electrochemistry; Solutions; Chemical equilibria; Membranes; Reaction kinetics; Quantum mechanics; The mathematical determination of atomic or molecular orbitals, energy levels, or properties; The application of mathematics to chemical systems and electronic spectra, excluding routine analysis or experimental results; Molecular spectra interpretation; Chemical reaction mechanisms in the gas, liquid, or solid phase between atoms, ions, or molecules; Atomic and molecular energy studies; Phase studies of nonmetallic systems; Isotherms; Crystallography.

For advanced materials, use 71Gen or the field of application.

For solid state physics, use 46D.

For thermodynamics, see also 46Gen.

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