

Information Sources in Chemical Engineering

INTRODUCTION

This guide is intended to help students to find information for an essay, project or dissertation in chemical engineering.

Accessing Library Resources – Findit@bham <http://findit.bham.ac.uk>

Findit@bham can be used to search for books, ebooks, journals, journal articles and databases. On the home page, there is a drop down menu to the right of the search box to help you identify the information you require as quickly as possible. On the results screen, there are further options to refine your results.

It is recommended that you sign in first using your University username and password (ADF account details), particularly if you want to search for journal articles and access databases. To access databases, click on the 'Find Databases' link towards the top right of the screen. Click on the 'Search by Subject' tab on the search page to see a list of the most important databases for each field of study.

LITERATURE SEARCHING

The process of systematically searching for information on a subject is often referred to as "literature searching". This is an important skill which involves the ability to search the literature of a subject comprehensively for bibliographical references (references to published literature such as journal articles, conference papers and books). There are different ways to do this, but it may be worth including the following steps:

1. Define Your Subject

This may be difficult at first since you may be unsure about what exactly the assignment is about. You may need to find definitions, or at least locate a description, of those aspects of your assignment which need clarifying.

Use some of the specialised encyclopaedias, handbooks and dictionaries which can help by clarifying a definition or suggesting further reading.

Try these reference books – the print ones will mainly be found in the Science Reference Collection in Zone LGC of the Main Library, the electronic ones (those without a classmark/shelfmark) via **Findit@bham**.

ENGnetBASE (CRC Engineering Handbooks online)

A searchable and browseable collection of over 1,000 handbooks all providing full text. Includes titles like *Efficiency and Sustainability in the energy and chemical industries: scientific principles and case studies* and *Industrial Combustion Testing*.

Knovel

A collection of authoritative science and engineering reference books, from several publishers. Knovel provides analytical tools to enable you to analyse and manipulate the data in these books.

NB Knovel includes "Sax's Dangerous Properties of Industrial Substances", but our subscription is through another platform, accessed via **Findit@bham**.

McGraw-Hill Encyclopedia of Science and Technology (Main Library: Science Reference Q 121 M)

This set of volumes contains articles about all the main topics in science and engineering, which are followed by lists of further reading.

Perry's Chemical Engineers' Handbook (Main Library: Science Reference TP 151 P)

Summaries and data tables for all the main topics of chemical engineering. Online version available via Knovel, see above.

Kirk-Othmer Encyclopedia of Chemical Technology

Deals with industrial processes and individual chemical substances, including information on their properties and manufacture.

Ullmann's Encyclopedia of Industrial Chemistry

Concise and comprehensive source for information on most aspects of industrial chemistry. Organised in two sets of volumes, Series A contains entries on chemicals, product groups, areas of applications, processes and technological concepts. Series B covers the basic principles (i.e. fluid dynamics, transport phenomena etc).

Encyclopedia of Chemical Processing and Design (McKetta) (Main Library TP 9 E)

Contains a series of monographs on important chemical materials, processes, methods, practices, standards and products of the chemical industry (including the related industries of petroleum, rubber, plastics, food and drugs)

Chemical and Process Technology Encyclopedia (Considine) (Main Library TP 9 C)

Covers inorganic, organic and physical chemistry

Gardner's Chemical Synonyms & Trade Names (Main Library QD 7 G)

Information on 40,000 trade names and chemicals (including CAS and EINECS numbers)

Comprehensive Dictionary of Physical Chemistry (Main Library QD 453 C)

Covers, amongst others: thermodynamics, kinetics, optical spectroscopy, molecular properties, surface and colloid chemistry, nuclear and solid state physics

Sax's Dangerous Properties of Industrial Materials

Data on toxicology, reactivity, fire, and explosive potential for a large number of substances. (Although this is on Knovel it is not included in our subscription to this service so access it through **Findit@bham**).

Filters and Filtration Handbook (Main Library: Short Loan TP 156.F5 F)**Piping Handbook (Crocker & King) (Main library TA 492.P6 K)****Wiley Encyclopedia of Food Science and Technology. (On Knovel and in Main Library Science Reference TP370/E).**

Includes properties, analysis and processing of foods; genetic engineering of new food products, and nutrition in an A-Z format. Also available on Knovel, see above.

CRC Handbook of Chemistry and Physics Main Library Science Reference q QD 65/D.

Electronic version via **Findit@bham**.

When defining your subject, consider the keywords that you will use in your search. Different words may be used to express the same concept, so be prepared to use new words or phrases which you will discover as you search. See the Library Guide *Effective Search Techniques* <https://intranet.birmingham.ac.uk/as/libraryservices/library/documents/public/alcd-guides/sk10.pdf>

You could also discuss your topic with your supervisor – he or she may be able to suggest various starting points.

Decide what time period your search needs to cover. Are you interested in reviewing recent developments, or do you want to cover the topic from the beginning? With some databases and indexes it is a good idea to start by looking for recent references, and work backwards.

2. Find Books

At University of Birmingham: **Findit@bham** contains records of books, printed and electronic, held at all of Library Services' libraries. Search by keyword or classification to find information in the library on your subject.

To locate print books (and other physical items like CDs, videos, print journals etc) in the library you will need the shelfmark from **Findit@bham**. For books in the Main Library the zone where the book is shelved is indicated on a diagram under the 'Locations' tab. There are zone plans on the wall before you enter the zone to help you find the right shelf.


Most of the books you will need should be in the Science and Engineering Subject Area, Zone LGC, of the Main Library. You may also want to use the Barnes Library in the Medical School, which contains books and journals covering Biochemistry and Microbiology.

At other libraries: All university libraries, as well as many public and special libraries, make their catalogues available free on the web.

In Bookdata Online: Bookdata is a searchable database of books providing global coverage, with comprehensive information on UK and US titles, as well as English language titles from Australia, New Zealand and South Africa. The service is updated daily and has powerful searching capabilities, including the option to search by chapters and contents

Amazon.co.uk is a good source of information on published books, giving further information on the content and sometimes reviews by the public.

3. Find Periodical (Journal) Articles

Periodicals are published on a regular basis. They are an important resource, particularly in the sciences, as they are where the most up to date research is published. To find periodical articles on a subject it is often best to use bibliographic databases, which index journal articles, conference papers, and other types of publication depending on the database. An abstract is often included providing a summary of the document. Often these databases have links to full text, via a  button, but if this button does not work, or is not present, then it is worth searching **Findit@bham** directly for the Journal title to see if the library subscribes to that journal.

Try these databases:

Abstracts in New Technologies and Engineering (ANTE) (A ProQuest database – see below).

ANTE indexes over 400 journals, magazines and newspapers on topics including: environment and safety; energy electrical and power engineering; communication; materials and metallurgy; measurement, testing and instrumentation.


Compendex: available from Ei Village

Compendex is an important database covering 5000 journals and conference proceedings in engineering and applied sciences. Coverage goes back to 1884.

Polymer Library

The Polymer Library covers all aspects of the rubber and plastic industry. Coverage is international with records from 30 countries, including Japan and China. Records start from 1972 and the database is updated twice a month

Technology Research Databases - ProQuest

A collection of over 20 engineering specific databases. To see the constituent databases click on the drop down menu next to the word 'Databases' to the left of the blue bar at the top of the page and then under the Technology Research Databases entry click the  symbol. You can then create your own set of databases to search. Of particular interest to chemical engineers are the Biotechnology and Bioengineering Abstracts collection.

Science Citation Index Expanded on Web of Science

This index covers more than 5000 journals across a wide range of scientific disciplines, and is one of five databases that make up the Web of Science, which is accessible via the ISI Web of Knowledge. The database covers material from 1900 onwards.

SciFinder

SciFinder is the online version of Chemical Abstracts, and is the largest bibliographic database for the chemical sciences. It indexes the chemical literature in its widest sense; thus medicine, environmental science, chemical engineering, materials science, earth science and many other disciplines are included. In addition to the usual title/author/keyword searching there are chemical structure and reaction searching and CAS registry number searching. Journal articles, conferences and importantly patents are indexed, besides other publications

Scopus


Scopus is a multi-subject database covering science, engineering, social science and humanities. Journal articles and conference papers are the main publications indexed and coverage goes back to 1960. As well as the usual help within the database there are some very useful online tutorials, accessed from the right hand side of the top menu bar on the search screen.

Reaxys – see section 6f below

All these databases are available from **Findit@bham**.

4. Find Periodicals (Journals) in the Library

Finding Electronic Journals

Once you have found the details of articles which interest you (either from a database or a list of references), you will need to find out if the full text is available to you. The easiest way to do this is by clicking on the  button within a database, then clicking through to the full text, if available, via the GO button. Alternatively, if you have a reference from a list then search Findit@bham for the Journal title and then navigate to the volume/issue you need.

NOTE – The library does not subscribe to all the journals that are published and if we do not have a subscription you will not be able to access the full text.

Finding print journals

Some journals, especially older volumes, are not available electronically, but may be available in print. Check **Findit@bham** by typing the journal title in the search box. Note the

shelfmark. Most of the titles which cover chemical engineering are held in Zone 1 D in the Main Library. You may also want to use the Barnes Library in the Medical School, which contains journals covering biochemistry and microbiology. Journals are shelved alphabetically by title, within the letters of the shelfmark.

5. Find Information on the Internet

There is a wide range of chemical engineering information on the internet, but you need to be wary of the quality of the information you find. Using subject gateways and sites such as those below, which are created by subject specialists, will ensure that you find valuable information:

Try these sites:

Internet for Chemical Engineering

<http://www.vtstutorials.co.uk/>

Choose the Chemical Engineering tutorial from the main Virtual Training Suite page, and then follow the links to the tutorial by clicking start. This is an interactive tutorial to help you learn how to find and use chemical engineering resources efficiently on the internet. You will also build up a list of key chemical engineering sites as you work through the tutorial, which takes about one hour.

Institution of Chemical Engineers (IChemE)

www.icheme.org/

The IChemE is the UK professional body for Chemical Engineers, whose activities are described on this set of pages. You need to be a member to access their resources.

American Institute of Chemical Engineers (AIChE)

www.aiche.org/

This is the American equivalent of IChemE.

The Society of Chemical Industry www.soci.org/

Chemdex

www.chemdex.org

Sheffield Chemdex is a free information gateway pointing to hundreds of useful chemistry resources.

ChemIDplus Advanced

<http://chem.sis.nlm.nih.gov/chemidplus/>

Household Products Database.

<http://householdproducts.nlm.nih.gov/>

Health and safety information, ingredients information for particular products, toxicology information.

IPCS (International Program on Chemical Safety) INCHEM

www.inchem.org/

Chemical safety information from intergovernmental organizations.

Links for Chemists

www.liv.ac.uk/chemistry/links/links.html

Chemistry section of the WWW Virtual Library. A catalogue of websites

Scirus

www.scirus.com/ A science search engine which only gives results from evaluated academic sites.

Toxnet

<http://toxnet.nlm.nih.gov/>

6. Use Other Sources of Information

a) ASTM Digital Library.

Full text of technical standards issued by ASTM International (formerly the American Society for Testing and Materials) covering materials, products, systems and services. Topics covered include Metallurgy, construction, paints, rubber, textiles, and water and energy technologies.

b) Barbour Index Professional Series

Full text searchable database of UK based health and safety information, including environment and food safety information. Contains regulations, guidelines, articles, summaries of key documents and Guides which provide a quick overview of a topic. Onscreen help is available.

c) British Standards

Full text of all British Standards in pdf format. These standards are officially approved specifications covering methods of testing, terminology, performance, construction requirements and codes of practice.

d) ESDU Database

The Engineering Science Data Unit Database consists of validated engineering design data for a wide range of subjects, including aerodynamics, engineering structures, fatigue, fluid mechanics, stress and strength and tribology. On-screen help is available

e) Patents Information

<https://intranet.birmingham.ac.uk/as/libraryservices/library/documents/public/alcd-guides/dsci20.pdf>

This Library Services Guide includes the benefits of using patents as an information resource, recognizing references to patents, and obtaining material from a patent library. It also provides links to patent databases.

f) Chemical Information

Reaxys

Reaxys is a large and powerful chemical information system which includes comprehensive information on millions of chemical substances and reactions. The two main components of this service are:

Beilstein - a source of organic chemical information, containing structural data and general information associated with over 7 million compounds.

Gmelin - which covers inorganic and organometallic chemistry.

As well as advanced text searching Reaxys allows chemical structure searching.

There is also self-training material available at www.info.reaxys.com/training-center

7. Keep Up To Date

If you are undertaking a project over a period of time, you might find it useful to set up email alerts so that each time a relevant article is published you are alerted to it.

ZETOC is an electronic service which allows you to set up email alerts to new articles from particular journals or on particular subjects.

Many bibliographic databases or electronic journals services also have their own current awareness/alerting service.

8. Cite Your References

Keep systematic records and follow the advice in the *Preparing and Quoting References using the Harvard System* leaflet

<https://intranet.birmingham.ac.uk/as/libraryservices/library/documents/public/alcd-guides/sk04.pdf> but check with your tutor which referencing system you should use.

There is more information about citing references on the Library Services i-cite web site at: www.i-cite.bham.ac.uk

You should include a list of the references that you have used at the end of your piece of work, and it is easiest to gather this information as you go along.

Bibliographic software, such as RefWorks, EndNote or Reference Manager can help with managing your references. More information can be found in the *Reference Management Software Guide*

<https://intranet.birmingham.ac.uk/as/libraryservices/library/documents/public/alcd-guides/sk15.pdf>

9. Get More Help if You Need It

Web pages www.library.bham.ac.uk

Just Ask! www.library.bham.ac.uk/help/ask.shtml

Tel: 0121 414 5828

Just Ask! Is an instant messaging service where you can talk to a librarian in real time and share web pages. If Just Ask! is off line you can send us your question 24/7 using the Just Ask email form.

Information Desks

The Information Desks are available for support and assistance with the information resources for your subject area. You can find these at the Reception and Information Desk in the foyer of the Main Library, and in the site libraries.

Subject Librarians

If you need further help in researching a subject for an assignment you can book an appointment with a subject specialist in Library Services. You will be given help and advice on how to research your subject, which sources to use, help with electronic sources etc. Details are available from <https://intranet.birmingham.ac.uk/as/libraryservices/library/subject/index.aspx> or the Reception and Information Desk in the Main Library.

Other relevant guides

Other guides you may find useful include:

Databases for Engineers

Preparing and Quoting References using the Harvard System.

Effective Search Techniques

You can find these guides on the web at: www.intranet.birmingham.ac.uk/library/howdoi

All Library Services documents are available in other formats, please contact Library Services on 0121 414 5828 or <https://intranet.birmingham.ac.uk/as/libraryservices/library/contact/justask.aspx> for information

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