高等学校试用教材

建筑类专业英语

给水排水与环境保护

（第二册）

English in Architecture and Construction

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中国建筑工业出版社

（京）新登字035号

本书按国家教委颁布的《大学英语专业阅读阶段教学基本要求》编写的专业英语教材。本册内容包括供水、水质检测、水处理、废水污水收集和处理、管网、生物处理系统、泵和泵站、大气污染、水污染、噪声污染、有害废物及其处理等。全书安排16单元，每单元除正课文外，还有两篇阅读材料，均配有必要的注释，正课文还配有词汇表和练习，书后附有总词汇表、参考译文和练习答案。全书的语言难度大于第一册，还对科技英语翻译技巧作了简要说明，并增加例句和翻译练习题。

本书供高等院校给水排水和环境保护专业三年级下半学期使用，也可供有关人员学习参考。

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第二册
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*
中国建筑工业出版社出版（北京西郊百万庄）
新华书店总店科技发行所发行
北京市兴顺印刷厂印刷
*
开本：787×1092毫米　1/16　印张：12¼　字数：292千字
1997年6月第一版　1997年6月第一次印刷
印数：1—5400册　定价：10.20元
ISBN7-112-03033-1
TU·2323（8149）

《建筑类专业英语》编审委员会

前　言

经过几十年的探索，外语教学界许多人认为，工科院校外语教学的主要目的，应该是："使学生能够利用外语这个工具，通过阅读去获取国外的与本专业有关的科技信息。"这既是我们建设有中国特色的社会主义的客观需要，也是在当前条件下工科院校外语教学可能完成的最高目标。事实上，教学大纲规定要使学生具有"较强"的阅读能力，而对其他方面的能力只有"一般"要求，就是这个意思。

大学本科的一、二年级，为外语教学的基础阶段。就英语来说，这个阶段要求掌握的词汇量为2400个（去掉遗忘，平均每个课时10个单词）。加上中学阶段已经学会的1600个单词，基础阶段结束时应掌握的词汇量为4000个。仅仅掌握4000个单词，能否看懂专业英文书刊呢？还不能。据统计，掌握4000个单词，阅读一般的英文科技文献，生词量仍将有6%左右，即平均每百词有六个生词，还不能自由阅读。国外的外语教学专家认为，生词量在3%以下，才能不借助词典，自由阅读。此时可以通过上下文的联系，把不认识的生词猜出来，那么，怎么样才能把6%的生词量降低到3%以下呢？自然，需要让学生增加一部分词汇积累。问题是，要增加多少单词？要增加哪一些单词？统计资料表明，在每一个专业的科技文献中，本专业最常用的科技术语大约只有几百个，而且它们在文献中重复出现的频率很高。因此，在已经掌握4000个单词的基础上，在专业阅读阶段中，有针对性地通过大量阅读，扩充大约1000个与本专业密切有关的科技词汇，便可以逐步达到自由阅读本专业科技文献的目的。

早在八十年代中期，建设部系统院校外语教学研究会就组织编写了一套《土木建筑系列英语》，分八个专业，共12册。每个专业可选读其中的三、四册。那套教材在有关院校相应的专业使用多年，学生和任课教师反映良好。但是，根据当时的情况，那套教材定的起点较低（1000词起点），已不适合今天学生的情况。为此，在得到建设部人事教育劳动司的大力支持，并征得五个相关专业教学指导委员会同意之后，由建设部系统十几所院校一百余名外语教师和专业课教师按照统一的编写规划和要求，编写了这一套《建筑类专业英语》教材。

《建筑类专业英语》是根据国家教委颁发的《大学英语专业阅读阶段教学基本要求》编写的专业阅读教材，按照建筑类院校共同设置的五个较大的专业类别对口编写。五个专业类别为：建筑学与城市规划；建筑工程（即工业与民用建筑）；给水排水与环境保护；暖通、空调与燃气；建筑管理与财务会计。每个专业类别分别编写三册专业英语阅读教材，供该专业类别的学生在修完基础阶段英语后，在第五至第七学期专业阅读阶段使用，每学期一册。

上述五种专业英语教材语言规范，题材广泛，覆盖相关专业各自的主要内容：包括专业基础课，专业主干课及主要专业选修课，语言材料的难易度切合学生的实际水平；词汇

以大学英语"通用词汇表"的4000个单词为起点，每个专业类别的三册书将增加1000～1200个阅读本专业必需掌握的词汇；本教材重视语言技能训练，突出对阅读、翻译和写作能力的培养，以求达到《大学英语专业阅读阶段教学基本要求》所提出的教学目标："通过指导学生阅读有关专业的英语书刊和文献，使他们进一步提高阅读和翻译科技资料的能力并能以英语为工具获取专业所需的信息。"

《建筑类专业英语》每册16个单元，每个单元一篇正课文（TEXT），两篇副课文（ReadingMaterialA&B），每个单元平均2000个词，三册48个单元，总共约有十万词，相当于原版书三百多页。要培养较强的阅读能力，读十万词的文献，是起码的要求。如果专业课教师在第六和第七学期，在学生通过学习本教材已经掌握了数百个专业科技词汇的基础上，配合专业课程的学习，再指定学生看一部分相应的专业英语科技文献，那将会既促进专业课的学习，又提高英语阅读能力，实为两得之举。

本教材不仅适用于在校学生，对于有志提高专业英语阅读能力的建筑行业广大在职工程技术人员，也是一套适用的自学教材。

建设部人事教育劳动司高教处和中国建设教育协会对这套教材的编写自始至终给予关注和支持；中国建筑工业出版社第五编辑室密切配合，参与从制定编写方案到审稿各个阶段的重要会议，给了我们很多帮助。在编写过程中，各参编学校相关专业的许多专家、教授对材料的选取、译文的审定都提出了许多宝贵意见，谨此致谢。

《建筑类专业英语》是我们编写对口专业阅读教材的又一次尝试，由于编写者水平及经验有限，教材中不妥之处在所难免，敬请广大读者批评指正。

《建筑类专业英语》
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Contents

UNIT ONE

Text Historical Development of Municipal Water Systems in the United States

[1] Today Americans use approximately 150 to 200 gpcd of water(including commercial usage) and domestic use is approximately 60 gpcd. ① On the average, over 37 bil gal of water daily are consumed in this country, most of it treated by a public water utility. ②

[2] The story of the development of the public water-supply systems in the US is not only the story of the water-supply field, but the story of a growing country as well; water and its many uses have been integral facets of the growth and expansion of the US. As a matter of record, the transformation of the US from a rural, agricultural nation to an urban, industrialized world power has in fact depended to a large degree on the water supply and the engineering needed to provide large amounts of water for domestic use, industry, and that of commerce. ③

[3] The earliest recorded public water-supply system in the US is credited to the City of Boston, Mass., in 1652. In these early days, people saw little need for a public water-supply system because the service offered did not appear to be as good as people could get from a private well or cistern. Water was "good" if it looked clean—sparkling, clear, cool, and free from foreign taste or odor. Such water was readily available from the backyard well. Most never stopped to think that typhoid, dysentery, cholera, and "summer complaint" could be caused by the water, which all too frequently came from a well not too distant from the family outhouse.

[4] It was not until after 1875 that scientific knowledge established for certain that waterborne germs caused typhoid and cholera, and it wasn't until after 1900 that the general public realized the danger of using impure water-regardless of how it looked or tasted. Unfortunately, until the 1800s and early 1900s, when filtration became relatively common, the public supplies were usually no safer than the private sources. It was common practice in early systems to take water directly from creeks and rivers, with little or no effort to treat it before the water was pumped into the distribution system. ④

[5] In 1800, there were only sixteen public water-supply systems in the US, most of them originally built for "fire protection and the laying of dust", with little thought given to domestic service. Most of these were in New England, or among the larger cities on the Atlantic seaboard.

[6] By 1850, the number of community systems had grown to 83, none of which had installed any purification processes with the exception of some basic turbidity control in the form of settling basins. However, the period around 1900 became known as the "New Era" in public water supply, primarily because treatment processes began to deliver better

water and better domestic service than could be realized from the private supply, such as a well or cistern.[5] In 1880 only 600 water systems were in existence, but by 1897 nearly 3,350 public water-supply systems were in existence—1400 of which were built between 1891 and 1897!

[7] By 1950, public water systems had reached their maturity. The fears and trepidation of the early years had vanished with the advent of technology, and in the 50 year period between 1900 and 1950 the success of public water supply became evident. In 1950, there were over 17,000 urban water systems in the US, and treatment techniques using coagulation, rapid filtration, and chlorination had changed the role of the public water supply from a "fire protection and laying of the dust" concept to a multi-million dollar industry.

[8] The technological advances of the past 200 years in the US water-supply field have possibly been the most important in the entire history of public water supply. Waterborne disease has been reduced to almost nothing, and the abundance of relatively inexpensive potable water has created a unique problem for the industry—the average customer has taken his public water supply for granted! New research and technology, needed to provide even more and better water, may prove to be expensive.

[9] Although water-supply service is one of the oldest industries in the nation and, in terms of volume, the largest supplier of a single commodity in the US, it is faced with several other areas of concern. Water quality problems are surfacing in many areas of the US. News reports flow in daily of pollution of the country's water by heavy metals.[6] Chlorine-resistant viral organisms threaten grave health concerns by rendering currently applied disinfection technologies impotent. Present facilities in many communities are totally incapable of handling contamination from accidental industrial or transportation spillages. Cross-connection and backflow potentials continue to haunt water systems because of insufficient regulation and inspection procedures.[7]

[10] Despite these obstacles, the water-supply field as a whole seems confident that it can overcome the problems, and rise to the challenge of the future. Using the tools of research, advancing technology, and plain hard work, water men are showing the grit and determination for which America is famous, and they are confident that they can continue to provide the best water available to the citizens of the US.

New Words and Expressions

utility [juːˈtiliti]	*n.*	公用事业公司，公用事业设备
integral * [ˈintigrəl]	*a.*	主要的，必备的，构成整体所必要的
facet [ˈfæsit]	*n.*	方面
cistern [ˈsistən]	*n.*	蓄水池，储水器
backyard [ˈbækjɑːd]	*n.*	后天井，后院

typhoid [ˈtaifɔid]	*n.*	伤寒
dysentery [ˈdisəntəri]	*n.*	痢疾
cholera [ˈkɔlərə]	*n.*	霍乱
outhouse [ˈauthaus]	*n.*	（户外）厕所
all too		可惜太，过于
waterborne [ˈwɔːtəbɔːn]	*a.*	水传播的，水生的
creek [kriːk]	*n.*	小溪，小河
distribution [ˌdistriˈbjuːʃən]	*n.*	传输
lay [lei]	*v.*	消除
seaboard [ˈsiːbɔːd]	*n.*	海岸线，沿海地区
turbidity [təːbiditi]	*n.*	混浊度
settle [ˈsetl]	*v.*	（使）沉淀
basin [ˈbeisn]	*n.*	水池，流域，排水区域
trepidation [ˌtrepiˈdeiʃən]	*n.*	惊恐，惶恐
advent * [ˈædvənt]	*n.*	到来，出现
with the advent of		随着……的到来
coagulation [kəuˌægjuˈleiʃən]	*n.*	絮凝，混凝
chlorination [ˌklɔːriˈneiʃən]	*n.*	氯化处理，氯气灭菌
potable [ˈpəutbl]	*a.*	可饮用的
surface [ˈsəːfis]	*v.*	暴露出来
chlorine * [ˈklɔːriːn]	*n.*	氯（气）
viral [ˈvaiərəl]	*a.*	病毒的
disinfection [diˌsinˈfekʃən]	*n.*	消毒，灭菌
impotent [ˈimpətənt]	*a.*	不起作用的，软弱无能的
contamination * [kənˌtæmiˈneiʃən]	*n.*	污染
spillage [ˈspilidʒ]	*n.*	泄漏，溢出
backflow [ˈbækfləu]	*n.*	回流，倒流
grit [grit]	*n.*	勇气和耐力

Notes

①gpcd = gallons per capita per day

②bil = billion

③As a matter of record,…depended to a large degree on…the engineering needed…domestic use, …and that of commerce.

句首，As a matter of record 作状语，修饰全句；短语动词 depended on 被介词短语 to a large degree 所分隔；needed 引出的分词短语作 engineering 的后置定语；that 替代 the use。

④It was common practice…to take…rivers, with little or no effort to treat it….

句首 it 为形式主语，真正的主语为 to take…rivers；句末的 with 结构作状语，用以补充说明。

⑤…and better domestic service than could be realized from the private supply, …

此处的 than 为连接词，引导比较状语从句，省略了主语部分，这种结构多用于正式文体。

⑥介词短语 of pollution…heavy metals 修饰主语 News reports，被谓语所分隔。

⑦Cross-connection 指在监督下的饮用供水和未经监督又不知其可否饮用的供水之间的连接。

backflow 指由压差引起的流动状况，使水流从预定的水源以外的一处或数处来源进入饮用供水配水管。

Exercises

Reading Comprehension

Ⅰ. Say whether the following statements are true (T) or false (F) according to the text.

1. Water and its many uses have played a vital part in the development of the US. ( )
2. According to the author, water was good if it looks clean—sparkling, clear, cool and free from foreign taste or odor. ( )
3. The early public water-supply systems in the US were originally built not only for fire protection and the laying of dust, but for domestic use, industry and that of commerce. ( )
4. During the period around 1900, which was known as the "New Era" in public water supply, treatment processes began to deliver better water and better domestic service than could be realized from the private supply. ( )
5. Despite the problems surfacing in the water-supply field, American water men are confident that they can continue to provide the best water available to the citizens of the US. ( )

Ⅱ. Choose the best answer for each of the following.

1. Which of the following statements is the topic sentence of Para. 2?

   A. The story of the development of the public water-supply systems in the US is not only the story of the water-supply field, but the story of a growing country as well.

   B. Water and its many uses have been integral facets of the growth and expansion of the US.

   C. The transformation of the US from a rural, agricultural nation to an urban, industrialized world power has depended to a large degree on the water supply.

   D. The engineering is needed to provide large amounts of water for domestic use, industry, and that of commerce.

2. The true reason that in those early days, people saw little need for a public water-supply system is that ______ .

A. the water from the system was not so good as people could get from a private well or cistern

B. the water from the system was as good as people cold get from a private well or cistern

C. most never stopped to think that typhoid, dysentery, cholera, and "summer complaint" could be caused by the water from a well not too distant from the family outhouse

D. it was not so convenient to get water from a public water-supply system as from a private well or cistern.

3. What has been the most important in the entire history of public water supply in the US?

A. The success of making the general public realize the danger of using impure water.

B. The success of public water supply.

C. The scientific knowledge that established for certain that waterborne germs caused typhoid and cholera.

D. The technological advances of the past 200 years in the water-supply field.

4. Why, according to the author, has the average customer taken his public water supply for granted?

A. Because it is easy to get the potable water.

B. Because the potable water is abundant and inexpensive.

C. Because new research and technology prove to be inexpensive.

D. Because waterborne disease has been reduced to almost nothing.

5. What problems is the US water-supply field faced with?

A. Water quality problems.

B. Cross-connection and backflow potentials.

C. New research and technology, needed to provide even more and better water, may prove to be expensive.

D. Both A) and B) .

Vocabulary

Ⅰ. Fill in the blanks with the words given below, changing the form where necessary.

settle	surface	pump
install	establish	

1. Industry will be required to ______ new equipment and meet tougher emission limits.
2. Once the link between waste disposal and disease in the population through drinking water supplies had been ______, steps were being taken to break this cycle.

3. As a result of the increase of the population and the contribution from municipal discharges, new problems have ______ in the water-supply field.
4. At the headworks sewage is screened and ______ before discharge into the Thames Estuary（河口）.
5. The company used two steam engines to ______ the well water to elevated reservoirs and then to the distribution system.

Ⅰ. Match the words in Column A with their corresponding definitions or descriptions in Column B.

Column A	Column B
1. advent	a. necessary (to complete something)
2. creek	b. coming or arrival
3. integral	c. the destruction of disease germs
4. utility	d. a small stream
5. disinfection	e. a public service

Translation **词义选择**

英语词汇也具有一词多义、一词多类的特点。正确选择一个词的意义是翻译中首先要解决的问题。选择词义一般从三方面着手：1. 根据词类确定词义；2. 根据上下文选择词义；3. 根据词的搭配习惯确定词义。

例 1. The service offered did not appear to be as good as people could get from a private (a.) well or cistern.
所提供的服务似乎还不如人们用自家的水井或水池方便。

例 2. He looked at me, as a colonel might look at a private (n.) whose bootlaces were undone.
他看着我，就象一位上校看着一位没有系好鞋带的列兵。

例 3. Scientific knowledge established for certain that waterborne germs caused typhoid and cholera.
科学知识确凿地证实了水生细菌可导致伤寒和霍乱。

例 4. He has been established in New York as a physician.
他已在纽约开业行医了。

例 5. In 1950, there were over 17,000 urban water systems in the US.
1950 年，美国城市供水系统已超过 17,000 个。

例 6. The social system in China is quite different from that in the US.
中国的社会制度同美国的大不相同。

Translate the following sentences into Chinese, paying attention to the underlined words.

1. A large portion of the flow to streams is derived from subsurface water.

2. Any notion of "safe yield" must consider each factor.
3. Water can be transported from either a ground or surface supply source directly to a community or, if water quality considerations indicate, initially to a water treatment facility.
4. Service reservoirs are also necessary in the transmission system to help level out peak demands.
5. Groundwater is an important direct source of supply which is tapped by wells.

Reading Material A

Groundwater and Surface-water Supplies

Groundwater is both an important direct source of supply which is tapped by wells and a significant indirect source of supply since a large portion of the flow to streams is derived from subsurface water.

Near the surface of the earth in the zone of aeration soil pore spaces contain both air and water. This zone, which may have a zero thickness in swamplands and be several hundred feet thick in mountainous regions, contains three types of moisture. ①Gravity water is in transit after a storm through the larger soil pore spaces. Capillary water is drawn through small pore spaces by capillary action, and is available for plant uptake. *Hygroscopic moisture* is water held in place by molecular forces during all except the driest climatic conditions. Moisture from the zone of aeration cannot be tapped as a water supply source.

On the other hand, the zone of saturation offers water in a quantity that is directly available. In this zone, located below the zone of aeration, the pores are filled with water, and this is what we consider groundwater. The stratum which contains a substantial amount of groundwater is called an aquifer. At the surface between the two zones, labeled the water table or phreatic surface, the hydrostatic pressure in the groundwater is equal to atmospheric pressure. An aquifer may extend to great depths, but because the weight of overburden material generally closes pore spaces, little water is found at depths greater than 600 m (2000ft). The water readily available from an aquifer is that which will drain by gravity. Each soil type thus has a specific yield, ②defined as the volume of water, expressed as a percent of the total volume of water in the aquifer, which will drain freely from the aquifer.

Groundwater supplies are often tapped by drilling wells into the ground and pumping the water up and out.

Many factors help determine the "safe yield" of a given well or a selected aquifer: ③

- precipitation (*P*)

- net groundwater flow to the area (G_N)
- evapotranspiration (E_T)
- surface flow out of the area (S_0)
- change in groundwater storage (G_s)
- change in surface water storage (S_s)
- cost of pumping.

Any notion of "safe yield" must consider each factor, and must reference a given time period. If we focus on the quantity of water available for a year, for example, and neglect cost, we can define safe yield S_F as:

$$S_F = P + G_N - E_T - S_0 - S_s - G_s$$

Other factors in the determination of safe yields include the transmissibility of the aquifer[④] (can the aquifer transmit the water to the well (s) at a rate great enough to sustain the demand) and the location of contaminated bodies of water (including salt water intrusion possibilities from the oceans and chemical migrations from disposal or spill sites).

Besides offering a source of well water, aquifers also combine with precipitation to feed surface water courses. Surface water supplies are not as reliable as groundwater sources since quantities often fluctuate widely during the course of a year or even a week, and qualities are restricted by various sources of pollution. If a river has an average flow of 10 cubic feet per second (cfs), it means often the flow is less than 10 cfs. If a community wishes to use this for a water supply, its demands for the water should be considerably less than 10 cfs in order to be assured of a reasonably dependable supply.

The variation in the river flow can be so great that even a small demand cannot be met during dry periods in many parts of the nation, and storage facilities must be constructed to hold the water during wet periods so it can be saved for the dry ones. The objective is to build these reservoirs sufficiently large to have dependable supplies.

Notes

①这一通气层中含有三种类型的水分。在沼泽地，该通气层的深度可能是零，在山区其深度可达几百英尺。

"this zone" 指 "the zone of aeration (通气层)"。

② "specific yield" 单位产水量。

③许多因素有助于确定某一水井或某一选定的含水层的可靠出水量。

"safe yield" 可靠出水量。

④Other factors in the determination of safe yields include the transmissibility of the aquifer…决定可靠出水量的其他因素包括含水层的输水率……。

"transmissibility" 含水层的输水率。

Reading Material B

Water Transmission

Water can be transported from either a ground or surface supply source directly to a community or, if water quality considerations indicate, initially to a water treatment facility, by different types of conduits, including:

- Pressure conduits: tunnels, aqueducts and pipelines
- Gravity-flow conduits: grade tunnels, grade aqueducts and pipelines

The location of the well field or river reservoir defines the length of the conduits, while the topography indicates whether the conduits are designed to carry the water in open-channel flow or under pressure. The profile of a water supply conduit must generally follow the hydraulic grade line to take advantage of the forces of gravity and thus minimize pumping costs.

Service reservoirs are also necessary in the transmission system to help level out peak demands. In practice, intermediate reservoirs close to the city, or water towers, are sized to meet three design constraints:

- hourly fluctuations in water consumption within the service area
- short-term shutdown of the supply network for servicing
- back-up water requirements to control fires.

These distribution reservoirs are most often constructed as open or covered basins, elevated tanks, or, in the past, standpipes. If the service reservoirs are adequately designed to meet these capacity considerations, then the supply conduits leading to them generally must only be designed to carry approximately 50% in excess of the average daily demand of the system or subsystem.

Before discussing flow, it might first be useful to review some important fluid properties.

The *density* of a fluid is its mass per unit volume. In common units, density is expressed as slugs per cubic foot, or as $lb \cdot sec^2/ft^4$. Density in the metric system is in terms of grams per cubic centimeter. The density of water under standard conditions is 1.94 in common units and unity in the metric system.[1]

Specific Weight represents the force exerted by gravity on a unit volume of fluid and therefore must be in terms of force per unit volume, such as pounds per cubic foot. The specific weight is related to density as

$$w = \rho g$$

where w = specific weight, lb/ft^3

ρ=density, $lb \cdot sec^2/ft^4$

g= gravitational constant, ft/sec^2.

The specific weight of water is 62.4 pounds per cubic foot.

Specific gravity of a liquid is the ratio of its density to that of pure water at a standard temperature.② In the metric system the density of water is one gram per cubic centimeter and hence the specific gravity has the same numerical value as the density.

The *viscosity* of a fluid is a measure of its resistance to shear or angular deformation and is defined as the proportionality constant relating the shear stress τ to the rate of deformation du/dy. This proportionality constant is usually written as

$$\tau = \mu(du/dy)$$

The assumption inherent in this definition is that the shear stress is directly proportional to the rate of deformation.③ Such a definition holds for many fluids, which are known as Newtonian fluids. Fluids for which the shear stress is not proportional to the shear rate are known as non-Newtonian fluids. An example of a non-Newtonian fluid is biological sludge. The term viscosity, when applied to biological sludge, is therefore significant only if either the rate of deformation or the shear stress is also specified.

In the metric system, a unit of viscosity is a poise, with units of grams per centimeter-second. Most fluids have low viscosity and a more convenient unit is the centipoise or 0.01 poise. The viscosity of water at 20℃ (68.4℉) is 1 centipoise. In the English system the unit of viscosity is pound seconds per square foot. One $lb \cdot sec/ft^2$ equals 479 poise.

Kinematic viscosity is defined as the absolute viscosity, μ, divided by the density of the fluid, or $\nu=\mu/\rho$. The dimensions of kinematic viscosity are square centimeters per second.

Notes

①标准条件下水的密度以英制单位计算为 1.94，公制为 1。
common units 此处指英制单位。

②to that of pure water = to the density of pure water

③该定义中原有的假设是：剪应力与形变率成正比。
inherent in this definition 为形容词短语作定语，修饰 assumption。