



普通高等教育“十一五”国家级规划教材



数控技术专业系列

数控技术应用专业英语

(第2版)

刘小芹 主编



高等教育出版社
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数控技术应用专业英语

(第2版)

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内容提要

本书是由高职院校教师与数控企业技术人员共同编写的一本工学结合的专业英语教材,是在第1版的基础上修订而成的。本书内容是按照企业数控加工的典型工作任务流程和学生学习知识与技能的认知过程而编排的。一方面向学生系统地介绍目前常用的数控系统和最新技术及其实践成果,另一方面介绍大量数控技术英语专业文章、操作与维护手册及专业术语。主要包括数控技术的起源与发展、数控原理及系统、数控机床结构及工艺、数控编程与加工、数控机床电气控制、现代制造技术等方面的内容。全书共有7个单元,每单元4篇课文。同时,每单元附有与课文内容相关的阅读材料。本书还附有专业词汇表、常用专业技术缩略语词汇表和参考译文。

本书可作为高等职业院校、高等专科院校、成人高校、民办高校及本科院校举办的二级职业技术学院数控及机械工程类专业的教学用书,也适用于五年制高职、中职相关专业,并可作为相关工程技术人员的参考书及培训用书。

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第2版前言

本书是高职院校教师与数控企业技术人员共同编写的一本工学结合的专业英语教材,所选素材均来自国内、外工程资料、用户手册和教材,全书内容是按照企业数控加工的典型工作任务的流程和学生学习知识与技能的认知过程而编排的。此次修订是为了适应不断更新的数控技术以及高等职业教育改革的需要。

此次修订具有以下特点:

1. 全部章节采用问题导入式、部分课文采用案例式教学方法,让学生带着工作具体任务学习。力求做到学习内容的宽度和深度循序渐进,删繁就简,尽量简化长难句,专业单词注有音标,图文并茂,目的是让学生在较短时间内熟悉专业文章、工程资料和操作手册的英文表达,并积累一定数量的专业词汇,使学生能够更直观地了解所学内容与实物的联系,培养阅读和应用数控技术原文资料的能力。

2. 介绍了近年来推广的快速原型技术、机电一体化技术、计算机集成制造系统、智能机器人等先进制造技术内容,还加入了模具、汽车、航空工业等应用数控技术的相关制造业及现代虚拟制造技术等内容,对于开阔学生的视野,了解行业动态,培养学习兴趣起到了关键作用。

3. 本书所选英文材料全部来自英文原版资料或设备手册,用词、句型、语法结构遵循英文使用习惯,有利于培养学生使用准确英语的习惯,避免形成“自创式”英语。

全书共分7单元,共28课,参考学时数为60学时。学习重点放在阅读理解、专业词汇积累和书面翻译上。同时,根据语言学习的特点,兼顾专业听、说能力的培养和提高,以加强对课文内容的记忆和理解,并为对外业务交流打下一定的基础。为巩固和拓宽学习内容,每单元都附有阅读材料。为了便于学生自学,课文词汇表中还包括一些扩展词汇(以加黑字体表示),所有课文都附有参考译文,同时还配有录音带供学生练习口语和正音,由来自英语母语国家的外籍教师录制。

本书由刘小芹任主编,王珏、薛恩任副主编。由来自于企业的徐建春、唐小琦、蒋开勤等技术专家和来自于高等职业院校的朱晓玲、李艳华、谢德荣、肖龙、游煌煌等参编。第一单元由刘小芹、朱晓玲、肖龙编写,第二单元由薛恩、谢德荣、李艳华编写,第三单元由王珏、徐建春、游煌煌编写,第四单元由刘小芹、蒋开勤编写,第五单元由王珏、唐小琦编写,第六单元由刘小芹、谢德荣、唐小琦编写,第七单元由刘小芹、王珏编写,词汇表由王珏编写,参考译文由薛恩编写,法拉克数控铣床G代码和M代码由王珏编写,缩略语词汇表由薛恩编写。

华中科技大学博士生导师、华中数控股份有限公司总经理陈吉红教授,澳大利亚机电工程专家 Bruce Skewes 先生及湖北省数控大赛评委王军审阅了书稿,并提出了宝贵意见。在本书的编写中,我们得到了朱涵良、宁顺清、李望云、应文豹、詹华西、张幼华、卢锋等老师、工程师及学生的帮助,在此一并表示感谢!

II 第2版前言 ○○○

由于编者水平有限,时间仓促,加上形势的发展也在不断提出新的要求,书中难免有疏忽和错误之处,敬请读者批评指正。

编者
2008年6月

Contents

Unit One	Fundamentals of Mechanical Engineering	1
Text 1	Engineering Drafting	1
Text 2	Engineering Materials	6
Text 3	Lathe	12
Text 4	Introduction to Metal-cutting	17
Reading Material		22
1 – 1	Cast Iron	22
1 – 2	Metal Cutting Tools	23
1 – 3	The Function of Tools	24
Unit Two	Basic Concepts of Numerical Control	26
Text 5	Historical Development of NC	26
Text 6	NC Machining Principle and NC System	30
Text 7	CNC Principle	34
Text 8	Cutting Tool Compensation	39
Reading Material		44
2 – 1	Classifications of NC Machines	44
2 – 2	Computer-assisted NC Programming	45
2 – 3	Benefits and Gains from NC	46
Unit Three	Basic NC Programming	48
Text 9	Introduction to NC Programming	48
Text 10	Basic Programming Commands	52
Text 11	Case Study of Turning Machining Programming	56
Text 12	Case Study of Milling Machining Programming	60
Reading Material		64
3 – 1	Three-jaw Chucks	64
3 – 2	Steps to CAM System Programming	65
3 – 3	Warnings and Cautions Related to Programming	66
3 – 4	Manual Machine Operation	68
Unit Four	NC Machine Tools	70
Text 13	Introduction to CNC Machining Center	70
Text 14	Coordinate System of Machining Center	75
Text 15	Automatic Tool Changer of Machining Center	79

Text 16	EDM Machine	84
Reading Material		89
4 - 1	Historical Development of CNC	89
4 - 2	Automatic Tool Changer Types	90
4 - 3	Local Coordinate System	92
Unit Five	NC Machines' Operation and Maintenance	94
Text 17	Control Panel Operation of NC Milling Machine	94
Text 18	MDI Operation of NC Lathe	98
Text 19	Daily Maintenance of the 3-Dimentional Measuring Machine	102
Text 20	3D Measuring Machine Installation and Adjustment	108
Reading Material		112
5 - 1	Warnings Related to Daily Maintenance	112
5 - 2	Special Coolant Systems	113
5 - 3	Return to Machine Referenced Point	114
Unit Six	Advanced Manufacturing Technologies	117
Text 21	Mechatronics	117
Text 22	Intelligent Robot	121
Text 23	Computer Integrated Manufacturing System (CIMS)	126
Text 24	Introduction to Rapid Prototyping	130
Reading Material		134
6 - 1	Rationale for Flexible Manufacturing	134
6 - 2	Computer Aided Manufacturing Systems	136
6 - 3	Tool-life Management Systems	137
Unit Seven	The Application of the NC Technology in Relevent Manufacturing Industries	140
Text 25	Injection Mold Design	140
Text 26	The Basic Components of an Automobile	146
Text 27	Machining Simulation with NX Machining Software of SIEMENS	150
Text 28	Aircraft Design and Manufacture	155
Reading Material		160
7 - 1	Feature—NC Programming for High Speed Machining	160
7 - 2	Engineers are Building Robotic Fin for Submarines	161
7 - 3	Internal Combustion	163
Translation of texts		165
第一单元	机械工程基础	165
第1课	工程制图	165
第2课	工程材料	165

第3课	车床	166
第4课	金属切削工艺简介	167
第二单元 数控基本概念		167
第5课	数控的发展史	167
第6课	数控加工原理及数控系统	168
第7课	计算机数控原理	169
第8课	刀具补偿	169
第三单元 数控编程基础		170
第9课	数控编程简介	170
第10课	基本编程指令	170
第11课	车削加工编程案例分析	171
第12课	铣削加工编程案例分析	172
第四单元 数控设备		172
第13课	计算机数控加工中心简介	172
第14课	加工中心的坐标系统	173
第15课	加工中心的自动换刀系统	174
第16课	电火花加工	174
第五单元 数控设备的操作与维护		175
第17课	数控铣床的控制面板操作	175
第18课	数控车床的手动数据输入操作	176
第19课	三坐标测量仪的日常维护	177
第20课	三坐标测量仪的安装与调试	178
第六单元 先进制造技术		179
第21课	机电一体化技术	179
第22课	智能机器人	180
第23课	计算机集成制造系统	180
第24课	快速原型技术简介	181
第七单元 数控技术应用相关制造业		182
第25课	注射模具设计	182
第26课	汽车的基本构造	182
第27课	西门子 NX 软件仿真加工技术	183
第28课	飞机的设计与制造	184

Appendix	186
Appendix I Vocabulary	186
Appendix II G code and M code for FANUC NC Milling Machine	205
Appendix III Abbreviations	209
Reference	213

Unit One

Fundamentals of Mechanical Engineering

本章的内容是学生熟悉的机械类专业通用知识,如工程制图、工程材料、常用机床、常用机械加工工艺等,目的是将学生过去已有的普通英语和专业技术知识有机地结合,学习的重点放在工程技术的英文表达方式和专业术语上。主要采用泛读、精读、朗读的学习方式,并通过讨论、提问、课内外练习,在理解的基础上熟记工程英语的常用表达方式、典型句型和专业术语,达到建立工程英语概念、积累基础知识、学会用英语表达自己的专业知识与技术的目的,为顺利地学习数控技术应用专业英语打下基础。



Text 1 Engineering Drafting

Engineering drafting is a very important means, which is used for engineering designs and engineering communications. We will introduce some key engineering drawing views as following:

1. Normal views

A normal view is a perpendicular projection onto a viewing plane parallel to the line. In the normal view, all points of the line are equidistant from the observer. Therefore, the true length of a line is viewed and can be measured. And the true size and shape of any figure in the plane can be determined.

2. Principal (orthographic) views

In a principal view (also known as a planar view), one of the sets of projections is normal to the view. That is, one of the planes of the object is seen in a normal view. The other two sets of projections are orthogonal and are usually oriented horizontally and vertically on the paper. Because background details of an object may not be visible in a principal view, it is necessary to have at least three principal views to completely illustrate a symmetrical object. At most, six

principal views will be needed to illustrate complex objects.

The relative positions of the six views have been standardized and are showed in Fig.1-1, which also defines the width (also known as depth), height and length of the object. The views that are not needed to illustrate features or provide dimension can be omitted. The usual combination selected consists of the front, top, and right side views.

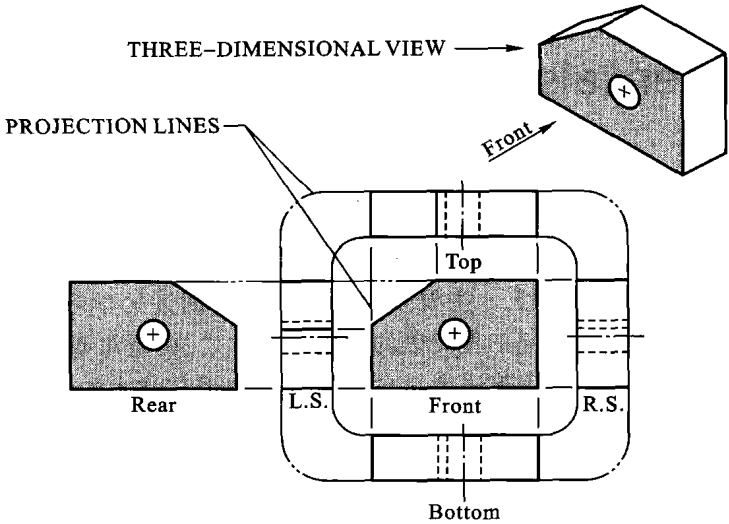


Fig. 1-1 Positions of Standard Orthographic Views

3. Auxiliary (orthographic) views

An auxiliary view is needed when an object has an inclined plane or curved feature or when there are more details than can be shown in the six principal views. The auxiliary view (Fig.1-2) is a normal (face-on) view of the inclined plane.

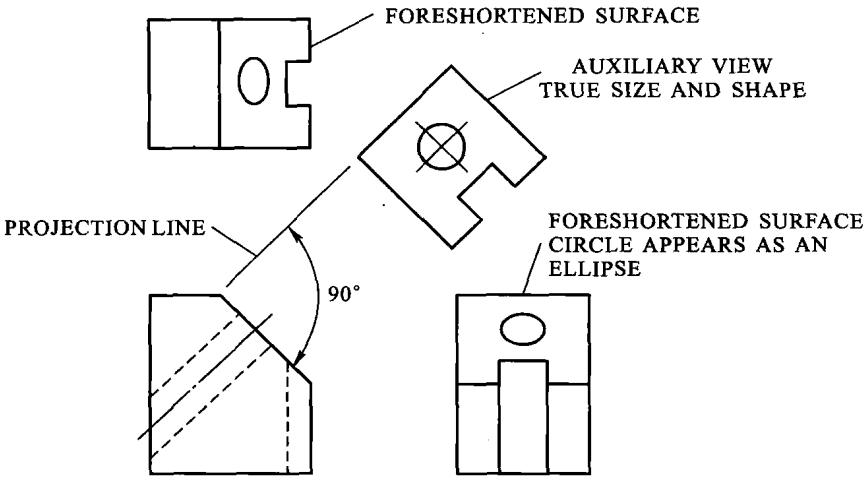


Fig. 1-2 Auxiliary Views

The projectors in an auxiliary view are perpendicular to only the direction in which a principal view is observed. Accordingly, only one of the three dimensions of width, height, and depth can be measured.

4. Sections

The term section is an imaginary cut taken through an object to reveal the shape or interior construction. Fig.1-3 illustrates the standard symbols for a sectioning cut and the resulting sectional views. Section arrows are perpendicular to the cutting plane and indicate the viewing direction.

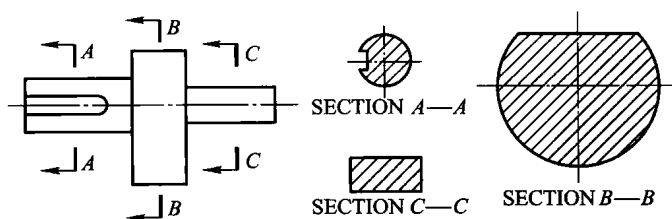


Fig. 1-3 Sectioning Cut Symbols and Sectional Views

New words and phrases

auxiliary (orthographic) view [ɔ:g'ziljəri] ([ɔ:θə'græfik]) [vju:] 辅助(正视)图

combination [ˌkɒmbɪ'neɪʃən] n. 组合

consist [kən'sist] of 由……组成, 由……构成

dimension [di'menʃən] n. 维(数), 度(数), 尺寸, 尺寸标注

drawing [ˈdrɔ:ɪŋ] n. 图纸, 草图, 手绘图

elevation [ˌeli'veɪʃən] n. 标高, 仰角, 提高, 海拔

engineering drafting [ˌendʒɪ'niəriŋ] [ˈdra:ftɪŋ] 工程制图, 工程图纸, 草图

equidistant [ˌi:kwi'dɪstənt] a. 等距离的

figure [ˈfɪɡə] n. 图形, 形(状)态, 数字(码, 目) vt. 表示, 描绘

front view 主视图(从正前方观察)

horizontally [ˌhɒri'zɒntli] adv. 地平地, 水平地

illustrate [ˈɪləstreɪt] vt. 图解, (用图解, 举例)说明

inclined plane [ɪn'klaɪnd] [pleɪn] 倾斜面

interior construction [ɪn'tɪəriə] [kən'strʌkʃən] 内部结构

measure ['meɪʒə] n. 测量, 度量标准 vt. 测量

mechanical engineering [mi'kænikl] [ˌendʒɪ'niəriŋ] 机械工程

normal ['nɔ:məl] view 正视图(垂直)

parallel [ˈpærəlel] a. 平行的 vt. 与……平行的

perpendicular projection [ˌpɜ:pən'dɪkjulə] [prə'dʒekʃən] 垂直投影

principle ['prɪnsəpl] (orthographic) view 基本(正交)视图

right side view 左视图(从左向右观察)

section ['sekʃən] n. 横截面,断面

symmetrical object [si'metrikəl] ['ɒbdʒɪkt] 对称物体

top view 俯视图(从顶向下俯视)

view [vju:] n. 视图,风镜,观点,观察,意见 vt. 观看,观察

vertically ['vɜ:tɪkəli] adv. 垂直地



Notes

1. means n. 手段,方法

means 是以字母“s”结尾的单、复数同形名词。它前面或后面的谓语动词单、复数形式取决于这些名词是用作单数还是用作复数。

例句: The only means to achieve success is to appeal to arms(诉诸武力).

取得胜利的唯一办法就是诉诸武力。

例句: All means have been tried out to increase production.

为了增产已试尽了一切办法。

例句: Engineering drafting is a very important means that is used for engineering designs and engineering communications.

工程绘图是工程设计和交流中采用的一种重要工具。

2. by means of

例句: Lift the load by means of a crane.

用吊车提起重物。

例句: The lathe may feed the cutter by hand or may make it be fed automatically by means of special gears.

车床的刀具可用手工进给或用挂轮自动进给。

3. orient v. 为……定方向,为……定位

例句: The other two sets of projections are orthogonal and are usually oriented horizontally and vertically on the paper.

另外两个投射方向相互垂直,在图样上通常是水平和垂直方向。

例句: The course was oriented towards foreign students.

这个课程是为外国学生开设的。

4. consists of 由某种事物组成或构成

例句: The usual combination selected consists of the top, front, and right side views.

通常选择的组合是俯视图、主视图和左视图。

例句: The committee consists of ten members.

这个委员会由 10 人组成。

5. section n. 横截面, 断面

例句: The term section is an imaginary cut taken through an object to reveal the shape or interior construction.

剖视图是假设通过物体将其切开以显示其形状或内部结构的视图。

这里, “section” 是 “term” 的同位语, 用于补充说明 “term”。

Exercises

I. Write True or False beside the following statements about the text.

1. _____ A normal view of a line is a perpendicular projection of the line.
2. _____ In a normal view, all points of the line are equidistant.
3. _____ A line will be viewed from an oblique position and will appear longer than it actually is.
4. _____ In a normal view of a plane, the true size and shape of any figure can be determined.
5. _____ Generally, the three principal views are orthogonal with each other.
6. _____ At most, five principal views will be needed to illustrate complex objects.
7. _____ The auxiliary view is perpendicular to the inclined plane.
8. _____ The section is an imaginary view which can be taken through an object.

II. Multiple choices.

1. In a normal view of line, the A length of a line B measured.
 A. a. shorter b. longer c. equal d. truth
 B. a. should be b. can be c. is d. was
2. It is common to A the front, side, and back views B elevations and to the C views as D views.
 A. a. refer to b. as c. was d. should
 B. a. is b. as c. was d. should
 C. a. right and left b. top and bottom c. front and back
 D. a. normal b. principal c. plane d. elevations
3. A normal view of a line is a A projection of the line onto a viewing plane B to the line.

- A. a. vertical b. sloping c. inclined d. horizontal
 B. a. cross b. parallel c. level d. perpendicular

4. A, only B of the three dimensions of width, height and depth can be measured.

- A. a. Generally b. So that c. Therefore d. So
 B. a. one b. two c. three d. zero

5. In the horizontal auxiliary view (auxiliary elevation), the A of an object can be measured. In a B auxiliary view, the object's depth can be measured.

- A. a. length b. width c. height d. depth
 B. a. top b. bottom c. back d. front

III. Fill in the missing words according to the text.

- Therefore, the true length of a line can be viewed and _____.
- All points of the plane are _____ from the observer. Therefore, the true _____ and _____ of any figure in the plane can be determined.
- The other two sets of _____ are orthogonal and are usually oriented _____ and vertically on the paper.
- The usual combination selected _____ of the top, front, and right side views.
- When an object has an inclined plane or curved feature, _____ is needed.

IV. Please answer the following questions in Chinese according to the text.

- 解释什么是正视图？正视图中任何图形的真实尺寸和形状都是可测量的吗？为什么？
- 什么是主视图？可用一个主视图完整地表示一个对称的物体吗？解释原因。
- 在什么情况下需要用辅助视图？为什么说长、宽、高中仅有一个可以测量？
- 什么是剖面图？
- 工程图的用途有哪些？



Text 2 Engineering Materials

Engineering materials are those used in manufacturing and become parts of products. Engineering materials may be further subdivided into: metals, polymers, ceramics, and composite. The composites are made up of two or more materials from the engineering materials. Each of the materials in a composite

retains its original characteristics. Examples of composite are concrete and glass reinforced polyester. Fig.2-1 shows standard AutoCAD hatch pattern of the different engineering materials.

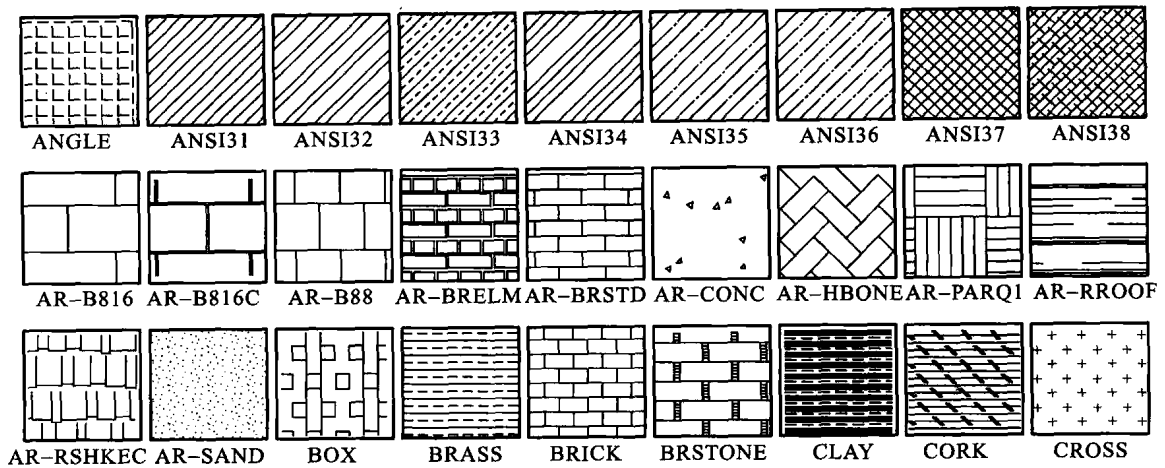


Fig. 2-1 Standard AutoCAD Hatch Pattern of the Different Engineering Materials

Common engineering materials are metals. Pure metals are seldom used in common industrial products. Pure copper is used in electrical applications, automotive radiators, and gaskets. Pure aluminum has applications in the chemical and electrical industries. However, most metals are alloys (combinations of two or more elements). There are over 2 500 different iron-carbon alloys (steels) and over 200 standard copper alloys including a number of brasses, bronzes, and nickel silvers. Each of these alloys is identified by a code number.

Steel is an alloy of iron and carbon with other elements added to produce specific properties. The various types of steel can be grouped under two major headings:

1. Carbon steel

The main alloying element is carbon in steel. Carbon steel is further divided into three groups.

(1) Low carbon steel. This steel has a carbon content of less than 0.30 per cent. It is the most common type and is often called mild steel. It is relatively inexpensive, ductile, soft, and is easily machined and forged. Mild steel cannot be heat-treated (hardened), low carbon steel is general-purpose steel.

(2) Medium carbon steel. This steel has a carbon content between 0.30 per cent and 0.80 percent. Harder and stronger than mild steel, it can be hardened by heat-treating. Medium carbon steel is most commonly used for forgings, castings, and machined parts for automobiles, agricultural equipment, machines and

aircraft.

(3) High carbon steel. This type of steel is easily heat-treated to produce a strong and tough part. The material has a carbon content above 0.80 percent. It finds wide use in hand tools, cutting tools, springs, and piano wire.

2. High alloy steel

These steels contain significant amounts of other elements in addition to carbon. The common high alloy steels are:

(1) Stainless steel. This steel is produced by using chromium as a significant alloying element along with nickel and other metals. The result is a tough, hard, corrosion resistant metal.

(2) Tool steel. This steel is a special group of high carbon steel produced in small quantities to high quality specifications. Tool steels are used for a wide range of cutting tools and forming dies.

(3) Manganese steel. This steel is an alloy containing 12 percent carbon. This metal is used in mining and railroad equipment because of its high tensile strength.



New words and phrases

aircraft['ækrɑ:ft] n. 飞机, 飞行器

alloy['æli] n. 合金

aluminum[,ælju'miniəm, ,ælə'miniəm] n. 铝, 铝元素

automotive radiator[,ɔ:tə'məutiv] ['reidiətə] 汽车散热器

brass[brɑ:s] n. 黄铜

bronze[brɒnz] n. 青铜

carbon steel['kɑ:bən] [sti:l] 碳钢

cast[kɑ:st] v. 铸造, 浇注 n. 铸造件

ceramic[si'ræmik] a. 陶瓷(材料)的 n. 陶瓷

characteristic[,kæriktə'ristik] n. 特点, 特性, 特色 a. 特性的, 有特色的

chemical['kemikəl] a. 化学的

chromium['krəʊmjəm] n. 铬, 铬元素

composite['kɒmpəzɪt, -zait] n. 合成材料, 复合材料, 合成(复合, 组合, 混合)物
a. 复合的

concrete['kɒkri:t] n. 混凝土

copper['kɒpə] n. 铜, 紫铜

corrosion resistant[kə'reʊʒən] [ri'zɪstənt] 防止锈蚀, 防腐

die[dai] n. 模具, 冷冲模

ductile['dʌktail] a. 可延展的, 有延展性的