

高职高专“十一五”规划教材

焊接专业英语

刘松淼 编著
邓开豪 主审



化学工业出版社

· 北 京 ·

本书共 12 个单元, 主要介绍了焊接的基本原理、焊接方法、焊接设备、先进的焊接方法和
技术、最前沿的焊接方法和技术等方面的焊接技术知识。本书取材基本上源于英、美文献原著,
美国焊机制造厂商文件和国内外全英文的前沿学术资料。内容由浅入深、循序渐进, 实用性
很强。

本书可作为高职院校不同基础英语水平的焊接专业学生的教材, 也可作为焊接工程技术人员
培养英文资料阅读能力的参考书。

图书在版编目 (CIP) 数据

焊接专业英语/刘松森编著. —北京: 化学工业出版社, 2008.5
高职高专“十一五”规划教材
ISBN 978-7-122-02656-9

I. 焊… II. 刘… III. 焊接-英语-高等学校: 技术学院-
教材 IV. H31

中国版本图书馆 CIP 数据核字 (2008) 第 060386 号

责任编辑: 韩庆利 高 钰

装帧设计: 史利平

责任校对: 宋 玮

出版发行: 化学工业出版社 (北京市东城区青年湖南街 13 号 邮政编码 100011)

印 装: 北京云浩印刷有限责任公司

787mm×1092mm 1/16 印张 7 字数 168 千字 2008 年 7 月北京第 1 版第 1 次印刷

购书咨询: 010-64518888(传真: 010-64519686) 售后服务: 010-64518899

网 址: <http://www.cip.com.cn>

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定 价: 14.00 元

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前 言

高等职业教育是我国高等教育的重要组成部分，是培养面向生产、建设、管理、服务第一线需要的具有实践能力和良好职业道德的高技能专门人才，因此专业课教学要加强针对性和实用性。随着焊接技术的应用日趋广泛，焊接技术的发展日新月异，从事焊接技术的人员必须掌握先进的焊接技术和新设备的使用等知识，这样英语水平对于专业技术的学习和提高起着举足轻重的作用。

本书编者已从事多年焊接专业的教学和研究工作，根据高职院校焊接技术及自动化专业应用型人才培养目标，从高职教育、学生的特点和实际出发，结合专业英语的教学实践来编写教材。学生在具备一定的焊接专业知识和一定的基础英语的基础上，通过由浅入深地阅读大量的专业英语内容，获得专业英语阅读能力和英汉转换能力，有助于加深对焊接专业知识的印象，为今后的工作打下良好的基础。

本书取材基本上源于英、美文献原著、美国焊机制造厂商文件和国内外全英文的前沿学术资料。全书共 12 个单元。每个单元由专业术语、课文、单词和词组、问题、练习和附加阅读等组成。最初的几个单元对难句进行了分析，后边的单元慢慢放开，使学生能逐渐达到自己阅读的能力。内容从焊接的基本原理开始谈起，介绍了焊接电弧、焊接方法、焊接设备、先进的焊接方法和技术、最前沿的焊接方法和技术等方面的焊接技术知识。在教学时，应以提高学生阅读、理解科技英语的能力为重点。建议用 48 学时完成本书的教学工作。

本书由渤海石油职业学院刘松森编著。广西工业职业技术学院邓开豪主审。在编写过程中，得到了汤彩萍、徐杰以及其他院校老师的大力支持和热情帮助，在此表示诚挚的谢意。

本书可向订书的院校和老师赠送电子教案、课文翻译和练习参考答案，如有需要，请发送电子邮件至 hanqingli@cip.com.cn 索取。

由于编者水平所限，加之时间仓促，书中难免有错误和不足之处，恳请广大读者和同行批评指正。

编者
2008 年 3 月

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Unit One

Part A Technical Words and Phrases

welding/'weldɪŋ/ *n.* 焊接

fusion welding 熔焊

pressure welding 压焊

brazing/'breɪzɪŋ/ *n.* 硬钎焊

soldering/'sɒldərɪŋ/ *n.* 软钎焊

gas welding 气焊

submerged-arc welding (SAW) 埋弧焊

oxy-acetylene welding 氧-乙炔焊

shielded metal arc welding (SMAW) 焊条电弧焊

tungsten inert gas arc welding; TIG welding 钨极惰性气体保护电弧焊

metal inert-gas arc welding; MIG welding 熔化极惰性气体保护电弧焊

metal active-gas arc welding; MAG welding 活性气体保护电弧焊

carbon-dioxide arc welding; CO₂ arc welding 二氧化碳气体保护电弧焊

Part B Reading Material——Typical Sentences

教学要点：常用句式的翻译

1. 定语从句（限制、非限制性定语从句）
2. 非谓语动词（动名词、分词、不定式及其短语的各种形式）
3. *adj.* 和 *adv.* 的原形、比较级、最高级
4. 表语从句
5. 状语从句
6. 被动语态
7. 倒装
8. 强调句式
9. with 的用法
10. as 的用法
11. since 的用法
12. although 的用法

典型句式：

1. The strength of a soldered joint is rather less than a joint which is brazed, riveted or welded.
2. There are a number of methods of joining metal articles together, depending on the

type of metal and the strength of the joint which is required [1].

3. The simplest method of welding two pieces of metal together is known as pressure welding.

4. Care must be taken to ensure that the surface are thoroughly clean first, for dirt will weaken the weld [2].

5. The two sheets to be spot welded are gripped between copper electrodes through which a heavy current is passed.

6. Butt joints are prepared for high-strength steels because they are more easily inspected and involve simpler stress patterns than lap joints.

7. Gravity aids in putting down the weld metal into a flat position, which is the easiest and fastest to execute.

8. Polarity is the quality of being attracted to one pole and repelled by the other.

9. The result is that the filler metal is given greater holding power for out of position welding and the deposits can be applied rapidly while the base metal is prevented from overheating.

10. When needed, polarity can be changed by moving the welding cables on the terminals of the welding machine.

11. As is well known, a high quality weld should be as strong as the base metal.

12. The arc is made between the electrode tip and the metal being welded.

13. It is this power massed at the point of the arc which brings the arc to such a high temperature and makes it so useful for welding.

14. This is one reason why the inert gas arc processes improve the weldability of stainless steel and aluminium.

15. With the automatic process the weld size, weld length, rate of travel, start and stop are all controlled by the equipment.

16. Since there is no flux or slag and very little spatter to remove, there is a considerable saving in total welding cost.

17. Although manual cutting is used extensively for salvage and repair work, machine flame cutting provides greater speed, accuracy and economy.

18. Only CNC control can follow a precision contour at the speed of 52 to 635 cm/min required by plasma arc machining systems.

19. When a material under tension reaches the limit of its elastic strain and begins to flow plastically, it is said to have yielded [3].

20. Movement of the specimen at right angles to the previous grind (or polishing) will make it easier to detect the removal of marks left from previous processing [4].

New Words and Phrases

1. joint/dʒɔɪnt/ *n.* 接头; 连接方法; 连接处; 接缝

2. rivet/'rɪvɪt/ *n.* 铆钉; *v.* 固定

3. plasma -arc 等离子弧

4. contour/'kɒntʊə/ *n.* 轮廓

Notes

[1] There are a number of methods of joining metal articles together, depending on the type of metal and the strength of the joint which is required.

连接金属件的方法有许多，其分类方法取决于金属的类型和所要求的焊点的强度。

句中 depending on the type of metal and the strength of the joint which is required **是在分词短语作状语，起补充说明作用，短语中的 which is required 是定语从句，修饰 the joint。**

[2] Care must be taken to ensure that the surface are thoroughly clean first, for dirt will weaken the weld.

要注意确保（焊件）表面首先完全清洁，因为污物将使焊缝的强度减弱。

句中 for 引出了一个原因状语从句。

[3] When a material under tension reaches the limit of its elastic strain and begins to flow plastically, it is said to have yielded.

当材料在拉力的作用下而达到它的弹性应变极限时，开始产生塑性流变，这就叫屈服。

句中 it 作形式主语，when 引导的状语从句作真正的主语。

[4] Movement of the specimen at right angles to the previous grind (or polishing) will make it easier to detect the removal of marks left from previous processing.

试样以垂直于前一道工序方向进行研磨或抛光，这样做可以更容易检验前一道工序（研磨或抛光）残留划痕的去除情况。

句中 it 作形式宾语，动词不定式 to detect the removal of marks left from previous processing 作真正的宾语。

Exercises

I. Translate the following words into English.

- | | |
|--------|----------------|
| 1. 焊接 | 2. 熔焊 |
| 3. 埋弧焊 | 4. 钨极惰性气体保护电弧焊 |
| 5. 压焊 | 6. 钎焊 |

II. Translate the following sentences into Chinese.

1. Material less than 0.25 mm thick is usually lapped, thicker material is commonly butted.

2. Polarity is important because in DC welders the flow of current, which is in one direction only, must be changed for some welding operations.

3. It is necessary to quickly freeze the filler metal to help hold the molten metal in position against the force of gravity.

4. It is always necessary for welders to have the knowledge about the electric arc.

5. Besides, there are other advantages to be obtained by coating electrodes, such as improved weld appearance, easier arc striking and maintenance, better penetration control and improved weld x-ray qualities.

6. It is the result of the successful effort of an electric current to jump across an air gap or other gas introduced in it circuit.

7. It is for this purpose that aluminium and beryllium are used to make aircrafts and

rockets.

8. The ionized gas, which contains equal numbers of positive ions(离子) and electrons, is known as plasma.

9. Although the absorption of neutrons(中子) by matter is comparable with that of high-energy X-rays or gamma rays, the relative absorption by various elements is quite different.

10. Consequently, creep(蠕变) is generally of concern with materials subjected to elevated temperatures and is a long-time effect.

11. A different method, known as spot welding, is usually employed for welding sheets metal together.

12. Metals of low electrical resistance will be difficult to spot weld.

13. The heat for fusion welding is generated in several ways, depending on the sort of metal which is being welded and on its shape.

14. An arc is struck between the two work, and the heat which is generated melts the metal at the weld.

15. These methods of joining metal are normally adopted for strong permanent joint.

Part C Supplementary Reading

1. Another advantage of the gas-shielded arc is that a neater and sounder weld can be made because there is very little smoke, fumes, or sparks to contend with.

2. Apart from the slightly oxidizing nature of carbon dioxide(chemical system CO_2), which increases with temperature as the gas dissociates, the gas would appear attractive as it is inexpensive and in plentiful supply.

3. If a reactive gas such as CO_2 shielding was used with the rimming steel filler wire normally caused for flux covered electrodes, the weld metal contained extensive porosity.

4. The need to combat rising labour costs and to produce more welders focused the need for a semi-automatic welding process for steel, and the potential of CO_2 led to considerable research activity.

5. There is considerable resistance introduced to the flow of the current, and it is this power massed at the point of the arc which brings the arc to such a high temperature and makes it so useful for welding.

6. It is easy to calculate the amount of expansion to be expected from a rod of the metal of unit length when it is raised through one degree of temperature.

7. Several different types of testing machines have been constructed in which the stress is applied by bending(弯曲), torsion(扭转), tension(拉伸) or compression(压缩), but all involve the same principle of subjecting the material to constant cycles of stress^[1].

8. One of the advantages of pack carburizing(渗碳) over other methods lies in the possibility of using almost any type of furnace that will hold the boxes, as long as the furnace is capable of maintaining uniform temperature^[2].

9. A high voltage across the filament(阴极) (cathode) causes it to emit electrons,

which are then driven to the target(anode) where the sudden deceleration(减速) results in X-rays^[3].

10. If a prospective purchaser of additional welding equipment had already built up years of experience in submerged arc welding and wished to augment(扩大) his capacity for mechanized downhand welding of pressure vessels he would certainly not be advised to buy CO₂ welding equipment^[4].

11. The scope of this particular type of microscope has also been increased further by fitting a head which analyze the energy dispersed from the electron beam, giving a rapid way of locating the elements present^[5].

12. A tendency to harden by rapid cooling necessitates the use of preheat to remove the quench effect of cold metal, and to reduce the cooling rate.

Notes

[1] Several different types of testing machines have been constructed in which the stress is applied by bending(弯曲), torsion(扭转), tension(拉伸) or compression (压缩), but all involve the same principle of subjecting the material to constant cycles of stress.

已经制造出来了几种不同类型的试验机, 用它们可以进行弯曲、扭转、拉伸、压缩等试验, 而它们都有相同的原理, 即材料承受周期不变的应力。

[2] One of the advantages of pack carburizing(渗碳) over other methods lies in the possibility of using almost any type of furnace that will hold the boxes, as long as the furnace is capable of maintaining uniform temperature.

As long as 是一个条件状语从句, 固体渗碳具有超过其他渗碳方法的优点之一是: 它可以使用任何装有渗碳箱的炉子, 只要炉子能够保持均匀的温度即可。

[3] A high voltage across the filament(阴极) (cathode) causes it to emit electrons, which are then driven to the target(anode) where the sudden deceleration(减速) results in X-rays.

高电压通过阴极使它发射电子, 电子在高压下运动直接打到靶上并突然停止, 从而产生X射线。

[4] If a prospective purchaser of additional welding equipment had already built up years of experience in submerged arc welding and wished to augment(扩大) his capacity for mechanized downhand welding of pressure vessels he would certainly not be advised to buy CO₂ welding equipment.

如果有人已积累了多年的埋弧焊经验, 想要扩大对压力容器进行机械化平焊的生产能力, 而需要添置焊接设备时, 当然不会劝他购买 CO₂ 设备。

[5] The scope of this particular type of microscope has also been increased further by fitting a head which analyze the energy dispersed from the electron beam, giving a rapid way of locating the elements present.

通过安装一个合适的探头使这种特殊类型的显微镜的应用范围进一步扩大, 可以用来分析发出的电子束的能量, 并能很快地查找出存在元素的位置。

本句中 Dispersed from ...作 the energy 的定语; giving a rapid way of locating the elements present 作伴随状语; which 引导定语从句。

Unit Two

Part A Technical Words and Phrases

welding technique	焊接技术	welding technology	焊接工艺
welding operation	焊接操作	welding sequence	焊接顺序
direction of welding	焊接方向	welding position	焊接位置
downhand welding	平焊	horizontal position welding	横焊
vertical position welding	立焊	overhead position welding	仰焊
vertical down welding	向下立焊	vertical up welding	向上立焊
cosmetic welding	盖面焊	welding condition	焊接工艺参数

Part B Reading Material—Passages

教学要点：段落的整体含义，句子、语法、词汇的翻译方法

1. Successfully working out SAW-DI series of capacitance discharge stud welding equipment. It has high quality. Bolts can be directly used in stainless steel, aluminums, copper etc. Its operation is simple and convenient. The equipment can be widely used in the manufacture of automobile, airplane, ship and mechanism etc^[1].

2. The arc welding solution arm is simple design prevents its torch cable from interfering with its robot arm, even when the torch cable wraps around the arm when welding^[2].

3. Model CG2-150 profiling gas cutting machine is designed to turn out different shapes of templates automatically. It is characterized by compact structure simple operation quality, high cutting accuracy, etc. The machine is a fairly satisfying gas cutting machine when used for turning out batch of workpieces is the same shape^[3].

4. Most aluminum MIG welding problems are caused by poor feeding. Since aluminum is relatively soft, it is important that the wire surface should be as smooth as possible for best feedability. INDALCO products provide easier feeding than other competitive products because they have fewer surface imperfections^[4].

5. Easy NC cutting machine, due to its unique cantilever unilateral drive structure, is featured with light weight, small inertia force, smaller occupying area, convenience to lift steel plate and less investment etc^[5].

6. Triple flame cutting machine is used for cutting straight groove. V, X, Y, K grooves can be cut at one time. The angle can be adjusted between 0°-45° for adjusting groove angle^[6].

7. The welding center consists of the welding manipulator, welding power supply(auto-

submerged arc welding machine, MAG welding machine, TIG welding machine, the little clearance submerged arc welding machine, the cladding welding machine with pole), the welding turning-roll or the welding positioner. It can be used to weld, metal vessel, steel structure in all orientation by various welding methods^[7].

8. MZ series submerged arc welding machines characteristic and use :

(1) Adopts the advance IC silicon-controlled technology, the ability of antijamming is strong, current fluctuation is little, the arc is steady;

(2) High welding performance with stable arc and smooth welding;

(3) Suitable for the generic or thick plate of carbon steel with long welded joint, and carbon arc gas gouging;

(4) Used extensively in ship building, large-scale metal structure, large-scale container and so on^[8].

9. The company has a powerful technological force in welding, machinery, electron, the cross of machinery and electron, and a number of technological workers who ever worked in military industry enterprises. We persist in the design and manufacture of the welding equipment and automatic welding special manipulator, have plentiful experience to provide advanced, practical and reliable products to every customer in the field of welding equipment and automatic welding machine^[9].

10. FYSK-1200 Portable NC cutting machines, like large gantry NC cutting machine, can cut any complicated planar(平面的) pattern. It is suitable for metal cutting by flame (carbon steel) and plasma(stainless steel, copper, aluminum). It is convenient and flexible like semi-automatic cutting machine, and can be shifted freely. No fixed place is needed^[10].

New Words and Phrases

1. stud welding 螺柱焊

2. inertia/i'nə:ʃjə/ *n.* 惯性; *v.* 固定

3. cantilever/'kæntili:və/ *n.* 悬臂式

4. unilateral/'ju:nilætərəl/ *adj.* 单边的

5. gantry/'gæntri/ *n.* 构台, 龙门

Notes

[1] 电容储能式 SAW-DI 型系列螺柱焊接设备, 很多功能已达到和超过国外同类产品, 可在低碳钢、不锈钢、铝、铜等金属板材上直接焊植各种螺钉, 操作简单、使用方便, 焊接后板材不变形。可广泛应用于汽车制造、飞机制造、船舶制造、机械制造等各行业。

[2] 弧焊集成管线弧焊机器人系统, 其以简单的结构, 即使在焊枪绕入臂内的焊接姿态下也不会导致焊枪干涉臂部。

[3] CG2-150 型仿形气割机是一种按型板气割出各种形状的自动仿型机器, 其特点是结构紧凑、操作简单、效率高、气割表面质量好、气割精度高。对于批量生产同一形状的气割零件是十分满意的气割机。

[4] 大多数 MIG 焊焊接铝出现的问题是送丝不良造成的。由于铝材相对较软, 因此平滑的焊丝表面是保证良好送丝的关键。INDALCO 焊丝与其他同类产品相比具有更强的送丝

性能，因为它具有光洁表面。

[5] 简易型数控切割机，采用独特的悬臂式单边驱动设计，具有重量轻、惯性小、占地面积小、起吊板方便、投资少等特点。

[6] 火焰三割炬是直线切割坡口时所用，可一次性切割出 V、X、Y、K 形坡口，角度可在 $0^{\circ}\sim 45^{\circ}$ 调整，从而来调整坡口角度。

[7] 该自动焊接中心由焊接操作机、焊接电源（自动埋弧焊机、MAG 焊机、TIG 焊机、窄间隙埋弧焊机或带极堆焊机）、焊接滚轮架或焊接变位机组成，可对金属容器、金属结构件等进行各种焊接。

[8] MZ 系列自动埋弧焊机的特点及用途：

- (1) 采用先进的可控硅控制技术，抗干扰能力强，电流波动小，电弧稳定；
- (2) 具有特殊的引弧装置，引弧可靠、快捷，性能稳定、焊缝成型美观；
- (3) 适用于碳钢中、厚板长焊缝的焊接及碳弧气刨；
- (4) 广泛应用于造船、大型金属结构、大型容器等行业。

[9] 公司拥有一批经验丰富的焊接、机械电气及机电一体化的专业技术人才和原军工企业的技术工人，长期致力于焊接装备、焊接自动化专机的研究与制造，积累了丰富的实践经验，可以在焊接自动化及应用领域为广大用户提供更先进、更实用、更可靠的产品。

[10] FYSK-1200 型便携式数控切割机与龙门式大型数控切割机一样，能切割任意复杂的平面图形。适合用于火焰（碳钢）等离子（不锈钢、铜、铝）的金属的切割。与半自动切割机一样方便灵活，可以随意搬移，不需要固定场地。

Exercises

I. Translate the following words into English.

- | | |
|-----------|---------|
| 1. 焊接工艺参数 | 2. 平焊 |
| 3. 向下立焊 | 4. 盖面焊 |
| 5. 焊接顺序 | 6. 焊接工艺 |

II. Translate the following passages into Chinese.

1. With advanced cutting machine industrial control system, the operation is concise, convenient and visible.

2. CG1-2 specializes in cutting the steel plate of “H” and other kinds of steel plates. And also it can cut different materials on the sloping line. This type of property is guaranteed. By the same time, it is easy to fix it and it is portable^[1].

3. A typical spot welding robot system is made up of robot manipulator, robot controller, welding gun, tip dresser, welding gun exchange system, positioner, jigs, circulation water tank, etc^[2].

4. The welding turning-roll is a kind of auxiliary for welding large weight cylinder. It adopts double-box of slowing speed, and double-motor to drive, with powerful driving strength^[3].

5. Zhengzhou yueda automatic welding equipment Co., Ltd. is a specialized enterprise which is engaged in the welding equipment and automatic welding machine's design and manufacturing. We also passed the ISO9001: 2000 international quality management system^[4].

6. The arc welding robot system can weld mild steel, stainless steel, aluminum materi-

al and copper material, etc. the thickness of the welding materials varies from zero point to a few millimeters and even to tens of millimeters^[5].

7. Laserman machine is particularly suitable for the welding with or without adding material. The laser technology allows the welding areas very difficult to be reached and allows to obtain seams with small section and very high quality. Thanks to spots perfectly controlled in sizes and energy, the thermically alternated area is considerably smaller compared to that obtained with the traditional welding systems^[6].

8. Once removed, surface films must be prevented from forming during the process of welding. In almost every welding process, therefore, there must be some way of excluding the atmosphere.

9. Furthermore, the flux protects the molten pool against the atmosphere by sealing it in an envelope of molten flux. Flux acts as a cleanser for the weld metal, modifies its chemical composition and influences the shape of the weld metal area.

10. Usually, no limit is placed on the plate thickness that can be welded in a single pass with a single machine setting. Likewise, there is no problem of slag removal or surplus flux recovery.

New Words and Phrases

1. laser/'leizə/ *n.* 激光
2. millimeter/'milimi:tə (r) / *n.* 毫米
3. concise/kən'sais/ *adj.* 简明的, 扼要的

Notes

[1] CG1-2 型 H 型钢切割机是一种专用于切割 H 型钢、槽钢等型材的专用切割机, 可进行斜线切割、开坡口等。本机具有性能稳定、整机结构紧凑、装卸方便、操作简单等特点。

[2] 典型的点焊机器人系统是由机器人本体、机器人控制器、焊钳、焊钳修磨器、换枪器、变位器、夹具、循环水冷箱等组成。

[3] 焊接滚轮架是我公司适应大吨位筒体环缝而研制的焊接辅助设备。采用双减速箱、双电极驱动, 驱动动力大。

[4] 郑州越达自动化焊接设备有限公司是从事焊接装备、焊接自动化专机的设计与制造的专业性高新技术企业, 已通过 ISO9001: 2000 国际质量管理体系认证。

[5] 弧焊机器人系统可以焊接低碳钢、不锈钢、铝材、铜材等, 焊接材料的厚度可以从零点几毫米到几毫米, 直至几十毫米。

[6] Laserman 激光机特别适合的焊接可加填充材料或完全不加任何填充材料。激光技术可完成一般较难达到的焊接区域, 并能焊缝很小而焊接质量高。由于焊点能完美地控制其大小及能量, 与传统的焊接系统相比, 焊接区域的热交换量很小。

Part C Supplementary Reading

1. This series covers the tilting, head & tailstock lifting and turning, head & tailstock tilting, and double-turning positioners. With the working bench going up or going down, turning and manipulating, the workpiece stays in the best position for being welded or for

being assembled^[1].

2. Turning terrace is used to the horizontal cutting of the large type sealing head, the cladding welding of pipe or plate, the horizontal or circling welding and the joint welding of the large type sphere. It is used widely to pressure vessel, petrochemical industry and so on^[2].

3. The liquid-penetrant method involves flooding the surface with a light oil-like penetrant solution that is drawn into the surface discontinuities by capillary action. After the excess liquid has been removed from the surface, a thin coating of absorbent material is applied to draw the traces of penetrant from the defects to the surface for observation.

4. With a metal having high thermal conductivity e. g. copper, heat applied at the weld point is dissipated quickly into the remainder of the metal; this necessitates a large volume, or a more intense source of welding heat, or preheating, in order to make up for the heat loss, hence the difficulty in spot welding copper.

5. Resistance welding is done by passing an electric current through two pieces of metal pressed together. The pieces coalesce at the surfaces of contact because more resistance and heat are concentrated there. The heat is localized where needed, the action is rapid, no fill-er metal is needed, the operation requires little skill and can easily be automated, and these advantages make the process suitable for large-quantity production.

6. LZ auto-welding terrace series consists of the fixing, the fixing & lifting, the traveling & lifting and so on. It is used widely to pressure vessel, petrochemical industry, electric power construction, engineering machinery, etc^[3].

7. Air plasma cutting machines characteristic and use:

Common grade or high grade non-contact type cutting machines.

Convenient for moving complete machine, visible.

Consumptive parts cooled by internal circulation water, guaranteeing longer service life of consumptive parts.

Unique contact tip structure, guaranteeing longer service life.

Equipped with manual bow compass, cutting round diameter up to 1000mm.

Equipped with straight cutting torch, the machine can be used together with semi-automatic bogie, profile machine for semi-automatic cutting.

Equipped with NC controller, it can be used for full automatic cutting together full automatic NC cutting machine.

Two step current regulation^[4].

New Words and Phrases

1. tilting/'tiltɪŋ/ *v.* 斜置、(使)倾斜; *n.* 倾斜、斜度

2. bench/bentʃ/ *n.* 工作台

3. coalesce/'kəʊə'sles/ *vi.* 结合、接合

4. manipulate/mə'nɪpjuleɪt/ *v.* 翻侧、操纵、变换

5. capillary/'kæ'pɪləri/ *adj.* 毛细的; *n.* 毛细管

6. terrace/'terəs/ *n.* 平台

7. clad/klæd/ *v.* 覆盖; *n.* 覆盖层

Notes

[1] 该系列由倾斜式、头尾回转式、头尾升降回转式、头尾可倾斜式以及双回转等多种形式的变位机，通过工作台的升降、回转、翻转使工件处于最佳焊接或装配位置。

[2] 回转平台适用于大型封头水平切割、管板堆焊、水平圆周焊接及大型球体的对接焊等，广泛应用于压力容器、石油化工等行业。

[3] LZ 型自动焊接平台分为固定式、固定升降式、行走升降式等多种形式。广泛应用于压力容器、石油化工、电力建设、工程机械等众多行业。

[4] 空气等离子切割机的特点及用途：

高低档非接触切割；

整机移动方便、外形美观；

消耗件采用内循环水冷却，确保更长的使用寿命；

电极结构独特，确保更长的使用寿命；

配备手动圆规，割圆直径达 1000mm；

配备直把割炬可以与半自动小车、仿型机进行半自动切割；

配备数控控制器可以与全自动数控切割机配套进行自动切割；

二档电流调节。

Unit Three

Part A Technical Words and Phrases

electrode negative; straight polarity	正接	metal transfer	熔滴过渡
electrode positive; reversed polarity	反接	groove/gru:v/	n. 坡口
heat input; energy input	线能量	spatter/'spætə/	n. 飞溅
penetration ratio	熔合比	root face	钝边
reinforcement; excess weld metal	余高	butt joint	对接接头
form factor of weld	焊缝成形系数	striking arc	引弧
welded joint	焊接接头	short circuiting transfer	短路过渡

Part B Reading Material

Basic Requirements of the Welding Processes

The ideal weld is one in which there is complete continuity between the parts joined and every part of the joint is indistinguishable from the metal in which the joint is made^[1]. Although this ideal is never achieved in practice, welds which give satisfactory service can be made in many ways. Not every welding process is equally suitable for each metal type of joint or application, and much of the skill of the welding engineer consists in the recognition of the essential requirements which a particular weld must satisfy and the choice of the appropriate welding process.

Each welding process must fulfil a number of conditions. Most important, every in some form, usually heat, must be supplied to the joint so that the parts can be united by being fused together. The heat may be generated by a flame, an arc, the resistance to an electric current, radiant energy or by mechanical means. In a limited number of processes such as pressure welding the union of the parts is accomplished without melting, but energy is expended in forcing together the parts to be joined and heat may be used to bring the weld region to a plastic condition. Fusion is generally considered as synonymous(同义的) with melting, but in the context of welding it is desirable to distinguish at once between these words. By common usage the word fusion implies melting with subsequent union, and it is possible for the parts of a joint to be melted but not fused together.

Two surfaces can only be unified satisfactorily if they are free from oxide or other contaminants. Cleaning the surfaces before welding, though helpful, is not usually adequate and it is a feature of every welding process that the contaminated surface film is dissolved or dispersed. This may be done by the chemical action of a flux or the sputtering of an electric arc or even by mechanical means such as rupturing and rubbing. The contaminants which