МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РОССИЙСКОЙ ФЕДЕРАЦИИ

Курганский государственный университет

Кафедра иностранных языков технических специальностей

АНГЛИЙСКИЙ ЯЗЫК

Практикум
по развитию навыков чтения и перевода
для студентов 2 курса
технологического факультета специальности
«Оборудование и технология сварочного производства»

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Чтение сокращений, дробей, определительных групп (цепочек) существительного.

1. Сокращения расшифровываются и переводятся следующим образом

AC	– alternating current	– переменный ток
d	– density	– плотность, удельный вес
DC	– direct current	– постоянный ток
^{0}	– deg. – degree	– градус, степень
ER brazing	– electric-resistance brazing	– пайка с применением нагрева пламени
f	– frequency	– частота
fce	– furnace	– печь
fl	– fluid	– жидкий
fpm	– feet per minute	– футов в минуту
ft	– foot	– фут (30,5 см)
GMA welding	– gas metal-arc welding	– дуговая сварка металлическим электродом в среде инертного газа
GTA welding	– gas tungsten-arc welding	– дуговая сварка вольфрамовым электродом в среде инертного газа
hr	– hour	– час
ht	– heat	– теплота
i.e.	– id est=that is	– то есть
in	– inch	– дюйм (25,4 мм)
min	– minute	– минута
mp	– melting point	– температура плавления
oc	– oxygen cutting	– кислородная резка
pc	– per cent	– процент
SAW	– submerged-arc welding	– дуговая сварка под флюсом
t	– temperature	– температура
UT	– ultrasonic test	– ультразвуковой контроль
wt	– weight	– вес
TIG welding	– tungsten-inert-gas arc welding	– дуговая сварка вольфрамовым электродом в среде инертного газа

0.1 – zero point one; nought point one; o point one
0.060 – zero point zero six zero; o point o six o
0.006 – o point two oes six
½ – one second; a half; a second
1/3 – one third; a third
3/8 – three eighth

2. Расшифруйте, прочитайте и переведите примеры с сокращениями и дробями:

5 ftm, 8 min, 4 in, 700 deg, 3/5 in, 7 ft, 20 mm, 10 pc, 3 hr, 30% wt.

3. Некоторую трудность представляет перевод определительных групп (цепочек) существительного, в которых определения, состоящие из одного слова или группы слов, занимают место перед существительным-ядром.

Перевод рекомендуется начинать с существительного и затем идти справа налево, задавая вопросы какой? чей? для чего? чего?. Например: hear source – источник теплоты; joint face – поверхность соединения; pressure vessel – сосуд, работающий под давлением; gas tungsten-arc welding – дуговая сварка вольфрамовым электродом в среде инертного газа

4. Чтобы найти определительную группу, нужно найти ее границы. Левой границей может служить артикль, местоимение, предлог; правой границей – сказуемое, причастие I и II, предлог. Например:

1. Inert-gas metal-arc welding is also known as “consumable-electrode inert-gas arc welding”.
2. Submerged arc welding is performed with a continuous electrode and a granular flux composed with or without alloying elements.
3. The lower melting point alloys are known as “soft” solders.

Text 1. WELDING

Чтобы хорошо ориентироваться в тексте и уметь извлекать необходимую информацию, следует прочитать весь текст, чтобы иметь о нем общее представление. При этом нужно опираться на такие сигнализаторы, как заголовки, числовые данные, знакомую лексику, интернациональные слова. За основу следует взять подлежащее, сказуемое, дополнение, перевести их и только потом строить схему изложения, выбирая наиболее важные факты, сокращая или объединяя отдельные предложения.

1. alloy – сплав
2. area
   joint area – место сварки, зона сварки
3. brazing – пайка, пайка твердым (тугоплавким) припоем
4. coalescence соединение, сращивание
5. face
   joint face – поверхность шва (соединения)
6. joint – соединение, стык, шов
   welded joint – сварное соединение
7. metal
   base metal - основной метал

filler metal - присадочный метал
8. to melt - плавиться
9. point - точка, конец, острие
10. pressure - давление, усилие
11. process
welding process - сварочный процесс, сварка
arc-welding process - дуговая сварка
gas welding process - газовая сварка
12. soldering - пайка, пайка мягким (легкоплавким
13. source
heat source - источник теплоты
14. weld - сварной шов, сварное соединение
15. welding
arc welding - дуговая сварка
braze welding - пайка-сварка
explosion welding - сварка взрывом
forge welding - кузнечная сварка
friction welding - сварка трением
induction welding - индукционная сварка, сварка индукционным нагревом
resistance welding - электрическая контактная сварка
ultrasonic welding - сварка ультразвуком

Not until comparatively recently was the value of welding as a standard method of joining metal as well as nonmetal pieces fully appreciated[1]. It was during World War I that[2] the various welding processes came into their own[3] because speed of production in every metal-using and metal-fabricating industry became a vital factor.

At first welding was limited to small or less important arts. Welding (1940) is employed for an almost limitless number of application including ships, structures and trains. The subject of welding may be divided into many processes.

There are more than 84 distinct welding processes in use today. Most of them employ one or more of the following principles to produce the welded joint.

The joint faces are progressively melted, causing them to flow together. A filler metal having the same characteristics as the parts to be joined (base metal) is commonly, but not always simultaneously melted to fill the joint area. Various arc and gas welding processes, among others use this principle.

The joint faces are heated to a temperature below their melting point but sufficiently high (above 800^0F)[4] to melt a filler metal to fill the joint. The filler

[1] was the value of welding … fully appreciated – здесь: нарушение твердого порядок слов с целью выделения
[2] it was … that – эмфатический оборот, эквивалентный русскому «именно»
[3] came into their own – получили должное
[4] Перевод температуры из градусов шкалы Фаренгейта (F) в градусы шкалы Цельсия (C) рекомендуется считать по формуле: C=5/9 (F – 32); $I^0F=5/9^0$ C

metal must be an alloy that will produce coalescence. The coalescence, or growing together of the parts joined, is the feature that distinguishes welding from mechanical or adhesive bonding. Brazing and braze welding satisfy these conditions. Soldering does not and therefore is not considered a welding process[5].

The joint faces are heated to a plastic, semimolten, or molten condition, and pressure is applied to complete the weld. Forge welding, resistance welding, and, to some extent, induction welding fall in this category.

Various forms of mechanical energy are used to squeeze, press or rub the joint faces into an intimate contact that results in a coalescence at the joint. In ultrasonic welding some pressure is used, but most of the energy comes from mechanical vibrations at the frequency of ultrasound. Friction welding employs the heat of friction obtained by rotating one part against the other, under pressure, until melting begins. In explosion welding there is some relative motion between the joint faces while under great pressure and, consequently, heat is generated. In these processes no outside heat source is used.

5. Read the text once more, then check up your understanding of the main idea of the text. Answer the questions.

1) What distinguishes welding from mechanical or adhesive bonding?
2) What welding processes use the principle of heating the joint faces and applying pressure?
3) In what processes is no outside heat source used?

6. Повторите Passive Voice. Формула: to be + III форма смыслового глагола. Составьте предложения по содержанию текста, подбирая подходящие по смыслу группы слов из 2-4 столбиков. Пассивную конструкцию рекомендуется переводить неопределенно-личной или личной форме глагола в действительном залоге, причем подлежащее пассивно.

1. The value of welding	must be		divided (into) …
2. Welding	can be	progressively	melted …
3.The subject of welding	may be		employed (for) …
4. The joint faces	is	commonly	applied …
5. A filler metal	(not)		appreciated …
6. Soldering	are	fully	considered
7. Pressure	was		used
8. Heat	were	simultaneously	generated
9. Heat source			heated
			limited

[5] Пайка легкоплавким (мягким) припоем не удовлетворяет этим условиям и поэтому не считается процессом сварки.

7. Переведите следующие предложения из текста, обращая внимание на инфинитив в функции обстоятельства цели. При переводе вставляйте союз «чтобы».

1. Most of welding processes employ one or more of the following principles to produce the welded joint.
2. A filler metal having the same characteristics as the base metal is commonly, but not always simultaneously melted to fill the joint area.
3. The joint faces are heated to a temperature below their melting point but sufficiently high to melt a filler metal to fill the joint.
4. The joint faces are heated to a plastic, semimolten or molten condition, and pressure is applied to complete the weld.

Text 2. ELECTRIC ARC WELDING

1. surface – поверхность
2. to invent – изобретать
3. owing to – благодаря
4. bonding – соединение, связь
5. carbon arc – угольная дуга
6. to bring about – осуществлять
7. power-engineering – энергетика
8. manufacture – производство
9. maintenance tool – ремонтный инструмент

Read the text, translate it and answer the questions.

Electric arc welding is a process in which surface to be joined are fused together by the heat of an electric arc. The electric arc was invented in 1802 by the famous Russian scientist V.V.Petrov, who demonstrated the possibility of utilizing its heat for fusing metals. Petrov's arc began to be practically used for the welding of metals owing to the outstanding researches of N.N.Benardos and N.G.Slavjanov. In 1882 Benardos invented a method of bonding and dividing metals by the direct action of electric arc, i.e. electric arc welding and cutting of metals by means of a carbon arc. He carried out welding not only with a carbon electrode but with a metal electrode as well and indirect action of electric arc.

Arc welding, which fifty years ago was a process known to few specialists has brought about a veritable technical revolution in heavy engineering, shipbuilding, power-engineering, in fact, in any branch of our national economy. Arc welding is used today in so many important industries that "if all arc welding were suddenly stopped, all the industry, transportation and public services would fall apart". This is understandable, since welding is used not only for manufacture of almost everything made of metal, but it is the maintenance tool which keeps our railroads, steel mills, power plants, air liners and space ships, motor cars and home appliances.

1. What is electric arc welding?
2. When was the electric arc invented?
3. When was a method of bonding and dividing metals invented and by whom?
4. What electrodes were used in welding?
5. Where is arc welding used nowadays?

Text 3. AUTOGENOUS (GAS) WELDING

1. autogenous welding - автогенная газовая сварка
2. flame - пламя
3. torch - сварочная горелка
4. to ignite - зажигать(ся), воспламенять(ся)
5. mixing chamber - смесительная камера (газовой горелки)
6. low-pressure torch - горелка низкого давления, инжекторная горелка
7. equal - равный
8. to deliver - доставлять, поставлять
9. velocity - скорость
10. suction - всасывание
11. ratio - отношение, коэффициент
12. rightward welding - сварка правым способом, правая сварка
13. leftward welding - левая сварка
14. additive - присадка
15. implement - инструмент, прибор

Read the text and answer the following questions:

1. What is the source of heat for autogenous welding?
2. What gas is used in autogenous welding?
3. What types of welding torch are mentioned in the text?
4. What is rightward welding?
5. What is gas welding used for?

In autogenous welding the source of heat is the gas flame obtained from a gas which is often acetylene. Acetylene mixed with oxygen in a torch when ignited gives a steady flame. The welding torch consists essentially of a gas mixing chamber and is designed in two types: the low-pressure injector type and the equal-pressure type. In the injector-type torch the acetylene is delivered at very low-pressure and the oxygen enters the torch at high pressure and velocity expanding in the mixing chamber. Then the acetylene is drawn by auction created in the mixing chamber in a constant ratio to the oxygen.

Autogenous welding is carried out in different ways and methods. According to the movement of the torch, welding may be divided into rightward welding and leftward welding. In rightward welding the torch moves ahead of the additive, and in leftward welding the additive moves in front of the torch.

Gas welding may be used for cutting metals and repairing agricultural machines and implements.

Text 4. ATOMIC-HYDROGEN WELDING

1. atomic-hydrogen welding - атомно-водородная сварка
2. sheet metal - листовой металл
3. worn surface - изношенная поверхность
4. rod - пруток, электродный стержень
5. parent metal - основной (родственный) металл
6. heat - тепло
7. tungsten electrode - вольфрамовый электрод
8. alternating current - переменный ток
9. to melt - плавить(ся)
10. to cool - охлаждать
11. to joint - соединять
12. to protect - защищать
13. the molten metal - расплавленный металл
14. flux - флюс
15. stream of hydrogen - поток водорода

1. Read and retell the text given below.

Atomic-hydrogen welding is an arc welding process in which unusually clean welds can be obtained. The process is particularly applicable to the welding of sheet metal, thin and moderate wall tubing, and to repair welding of the worn surfaces. The process may be used with or without filler rods. An advantage in repair welding is that sound dense deposits of properties of the parent metal can be produced with proper selection of filler material.

In the atomic-hydrogen process the heat of an arc is used indirectly as a source of welding heat. An arc is established between two tungsten electrodes using alternating current. At the same time, streams of hydrogen gas are passed along the electrodes, through the arc, and toward the base metal to be welded. The arc heats the hydrogen to a high temperature, perhaps 9,000° F. Leaving the arc, the hydrogen strikes the metal to be welded, raising its temperature and melting it, using the additional heat of combination. At high temperatures molecules of hydrogen fall apart.

The arc in atomic hydrogen welding heats the metal not only by imparting its thermal energy, but also by the heat of combination of hydrogen atoms. The hydrogen also serves as a shielding gas to protect the molten metal from the atmosphere. The metal being welded is surrounded by hot hydrogen.

2. Make up written translation of the first and the second paragraphes.

Text 5. SUBMERGED-ARC WELDING

1. submerged-arc welding - дуговая сварка под флюсом
2. consumable electrode - плавящийся электрод
3. powdered flux - порошкообразный флюс
4. granulated flux - гранулированный флюс
5. bare electrode - оголенный электрод
6. feed - подача; to feed (fed) – подавать
7. blanket - поверхностный слой
   the blanket of flux - флюсовое покрытие
8. jaw - кулачок
9. wire - проволока
10. hopper - бункер
11. to solidify - затвердевать
12. slag - шлак
13. to float - плавать, держаться на поверхности

Very early in the progress of electric arc welding, a need was recognized for some form of protection for the weld metal from the atmosphere. The first developed methods were coatings applied to the consumable electrodes of hand welding. After this came various attempts to introduce mechanization to the welding process. The first powdered fluxes that were developed for separate introduction into the weld zone, while a base metal material was continuously and mechanically fed, frequently produced a very vigorous arc action with sparking and spattering metal.

Bur gradually more satisfactory fluxes, techniques and processes were developed and one of such welding processes that have come into wide use is the submerged-arc or submerged-melt process. In this process, a specially manufactured granulated flux is deposited on the joint to be welded, of sufficient depth to complete cover the end a bare metallic electrode, shielding the arc during the welding operation. The entire welding action takes place beneath the blanket of flux without sparks, smoke, spatter, or flash, and the electrode is fed by power into the granulated material at an automatically controlled rate, depending on the required length of arc.

The welding heat for the submerged-arc process is generated by the passage of an electrical AC or DC current between the end of a bare electrode wire submerged in a finely granulated flux or slag and the base metal to the welded.

Operation. A bare electrode wire, coiled on a reel of 60 or 200 lb and in diameters ranging from 5/64 in to ¼ in, is fed by mechanically powered drive rolls continuously into the arc. Current is fed to the wire through contact jaws between which the wire passes. An arc is formed between the electrode and the work. The arc is completely covered at all times by the flux, which is deposited continuously, from hopper, around the wire as it is fed to the work. The arc melts the electrode and the base metal. When the current flows through the

circuit, a portion of the granulated flux surrounding the electrode end becomes molten. This molten blanket of material is very effective in shielding the arc and the molten metal from the atmosphere. The melted flux adjacent to the arc floats on the surface of the molten metal and solidifies in the form of slag on the top of the weld. After the weld is completed, the slag is readily removed from the weld.

1. Answer the following question.
   1) What arc did the first powdered fluxes produce?
   2) How is the molten deposit protected in this process?
   3) What wire is used in submerged-arc welding?
   4) What material is deposited to cover the joint from atmosphere?
   5) Are there any sparks, spatter and flash during the welding action?
   6) How and where is the welding heat generated?
   7) What current is used in submerged-arc welding?
   8) How is current fed to the wire?

Additional text

Read the text and tell a few words about the equipment used in submerged-arc welding, the power sources and advantages of the process.

Equipment

Equipment is available for both fully automatic operation, as well as semiautomatic operation, wherein wire feed is automatic, but the travel speed and direction is controlled by hand rather than machine. For manual operation, which is sometimes done, the electrode wire is fed through a flexible tube by a wire driving mechanism.

Automatic heads are available for operation with either AC or DC and for either shop or field operation. The heads can be mounted stationary while the work is moved in relation to the electrode, or the head can be moved in relation to the work. Two or more heads can be mounted together to create multiple arc in tandem, which still further increases the rate of deposition.

Power sources for welding heads include transformers, motorgenerators and rectifiers.

Since the arc and the weld metal are completely shielded from the air by the blanket of flux, uniform and high quality welds are produced. In addition, greater penetration is provided because of the higher concentration of the heat due to the insulating qualities of the flux. The flux blanket also controls the bead shape and allows the use of much higher current densities than can be employed with an open arc. The high currents, of course, lead to deep penetration of the base metal and fast deposition of electrode wire. Since a large amount of material is molten in one time, it is essential that the weld be done in a horizontal or flat position.

Text 6. ELECTRODES

1. to bear in mind - помнить
2. brittle - хрупкий
3. to prevent - предотвращать, препятствовать
4. to surround - окружать
5. bare electrode - электрод без покрытия
6. to encounter - встречаться
7. powdered flux - порошкообразный флюс
8. coated electrode - покрытый электрод
9. core wire - электродный стержень, электродная проволока
10. to convey - передавать
11. fatigue - усталость
12. to facilitate - облегчать, способствовать

1. Read the text and find out:

1) в каком абзаце говорится о том, что необходимо сделать для получения наплавленного металла хорошего качества;
2) в каком абзаце говорится о том, от чего зависит успех сварочной операции;
3) в каком абзаце говорится об электродах без покрытия.

When considering electrodes it is necessary always to bear in mind the fact that heated metal combines chemically with oxygen and nitrogen from the atmosphere, forming oxides and nitrides which result in brittle, poor-quality weld metal. For this reason it is essential to provide some means of preventing the atmosphere from reaching the hot weld area. This can be done either by surrounding the area with an inert gas or by the use of a suitable flux.

Metal-arc welding was originally done with bare electrodes consisting of a piece of wire or rod of the same composition as the metal to be welded. For the reason mentioned above, the welds were of poor quality, and thus bare electrodes are now rarely encountered. Bare wire is used for automatic welding, but in this case the welded area is protected from the atmosphere by either powdered flux or an inert gas.

Most modern electrodes are of the coated or covered type, consisting of a metal core wire surrounded by a thick coating. To a large degree, the success of the welding operation depends on the composition of the coating, which is varied to suit different conditions and metals.

An electrode holder is simply a clamping device for holding the electrode, the welding current being conveyed through the holder to the electrode. The clamping portion must be so designed as to hold the electrode securely, yet permit it to be changed quickly and easily. It should be light in weight in order to reduce fatigue and facilitate ease of handling.

2. Tell a few words about different types of electrodes.

Text 7. TIN-LEAD SOLDERS

1. means - средство
2. solder - припой
3. to perform - выполнять
4. application - применение
5. expensive - дорогой
6. ordinary - обычный, простой
7. constituent - составная часть
8. weldability - свариваемость
9. reduction - сокращение, уменьшение
10. price - цена; cost - цена, стоимость
11. careful - тщательный
12. tangible - реальный, ощутимый
13. saving - экономия
14. low-grade alloy - сплав низкого качества

1. Read and translate the text.

As a practical means of joining, soldering is easy to perform and is widely used. Solders have found applications from the most expensive electronic equipment to ordinary car radiators. In these diverse fields, a relatively few solder alloys are used, based on tin in varying proportions (30 to 63 wt-% is the tin content range in normal applications).

Tin is essential in the currently used solder alloys, as the constituent that ensures weldability of the allow relative to the base material. High service temperatures are common in modern electronic assemblies, with levels around $70^{o}C$ tolerated by components under continuous work conditions, and even higher ones over short periods.

These solder alloys are by no means perfect. The price of tin used to be high until a few years ago, and even after its reduction, it still dictates the end cost of solder alloys. Several attempts to reduce the tin content have been made and straight tin-lead solders have very good welding properties.

Careful selection of the right solder for a specific selection can make for tangible savings, especially with lower-grade alloys, which can be replaced by the inexpensive alloy, without undesirable consequences.

2. Retell the text according to the plan:

a) The application of solders;
b) The proper selection of solders.

Text 8. ELECTRIC SLAG WELDING

1. downhand position - нижнее положение
2. repair work - ремонт
3. building-up - монтаж, сборка
4. worn - изношенный
5. to cast - отливать; casting - отливка
6. saving - экономия
7. order - порядок
8. trend - направление, тенденция
9. weight - вес
10. waste - потеря, убыток
11. capacity - мощность, производительность, нагрузка
12. to expand - расширять(ся)
13. to impair - ухудшать(ся)

1. Read and translate the text.

Originally, electric slag welding was applied to vertical joints, where they could not be welded in the downhand position convenient for the are process. Its efficiency soon made the electric slag process a basic method for welding heavy sections. Electric slag welding is now employed to make welds in both production and repair work, for the building-up of worn surfaces and for special purpose casting.

In some cases welded structures mean a saving of metal. However, the advantages of electric slag welding are not only of a purely economical order. Its use has radically changed the trend of development in heavy engineering. In recent years, the requirements of various industries have been running ahead of what heavy engineering was able to offer in terms of size and weight of large machines and structures. In most cases, the size of machine elements is limited by the maximum weight of molten metal that can be casted. The weight may be much larger than that of the finished product due to the waste of metal. In turn, the maximum weight of a casting is limited by the lifting capacity of the cranes available, the capacity of melting furnaces, and by the fact that the quality of metal is impaired as size of a casting increases.

The size and weight of machine elements could be increased, if the above listed production capacities were expanded in proportions. Electric slag welding, however, offers an entirely different approach.

2. Agree or disagree with the following statements:

a) The advantages of electric slag welding are only of a purely economical order.
b) Electric slag welding is now employed only for repair work.
c) Its high efficiency soon made the electric slag process a basic method for welding heavy sections.
d) The quality of metal is impaired as size of a casting reduces.

Text 9. SOLDERING

1. soldering - пайка легкоплавким припоем
2. solder - припой, мягкий припой
3. nonferrous metal - цветной металл
4. tin - олово
5. lead - свинец
6. to add - добавлять, дополнять
7. soldering iron - паяльник
8. strength - прочность, сила
9. to ensure - обеспечивать

1. Read and translate the text.

Soldering is a group of metal joining processes wherein the filler metal is a nonferrous metal or alloy whose melting point is below 700^{o}F. The usual filler metal is solder, an alloy of tin and lead in various proportions. Small quantities of certain other metals may be added. Since solder melts at a relatively low temperature, it is easier to apply than the filler metal in brazing. Ordinary gas flames and electric resistance-heated soldering irons may be used to supply the required heat. The fluxes used with soldering include rosin, zinc chloride and other substances.

Most metals, such as iron, steel, copper and copper alloys can be joined by soldering. The strength of soldered joints is relatively low and is determined by the strength of the soldering metal. Soldering is most commonly used to ensure good electrical contract in joining wires and small parts.

2. Answer the following questions.

1) What is soldering?
2) What fluxes are used in soldering?
3) How is the strength of soldered joint determined?
4) Where does soldering find its application?

Text 10. ELECTRODE HOLDERS

1. a multipurpose tool - многоцелевой инструмент
2. to hold (held) - держать
3. to remove - удалять
4. to insert a fresh electrode - вставлять новый электрод
5. copper lug - медное ушко
6. handle - рукоятка, ручка
7. in addition to - кроме
8. welder - сварщик
9. to insulate - изолировать
10. to grip - зажимать

11. jaw - тиски
12. maximum life - максимальный срок службы

The metal-arc electrode holder is in reality a multipurpose tool. Besides holding the electrode security during welding, it must also be so constructed as to provide an easy means of removing the burned stub and inserting a fresh electrode. This electrical contact as is provided at the holder cable connection. Usually, the cable is connected to a copper lug within the handle by a mechanical or soldered joint.

There are many requirements for an electrode holder in addition to giving the welder a convenient means for holding and guiding the electrode. An important point is that the welding current must be conducted from the cable connection to the electrode with a minimum of resistance: otherwise there will be heat, which might make the electrode holder too hot for comfortable use.

An insulated handle will, of course, reduce the heat effect. On some holders, the entire holder is insulated to reduce the possibilities of electrical shock during welding.

The electrical contact between the metal-arc electrode and electrode holder is obtained in one of several ways. The more common method is to grip the electrode between two jaws by means of pressure exerted by a powerful spring. In another jaw-type holder, the gripping pressure is provided by a screw and cam action. A third type of holder eliminates jaws by having the electrode inserted in a hole, where it is held in place by screw action to insure good electrical contact.

Some holders are distinctive in character and designed to do a specific job. Though electrode holders may look different they serve the same purpose.

Tell about: a) the metal-arc electrode as a multipurpose tool;
b) the requirements for an electrode holder.

Text 11. ULTRASONIC TESTING

1. to detect - обнаруживать, выявлять
2. flaw - трещина, дефект
3. sensitivity - чувствительность
4. non-destructive testing - испытание без разрушения образца
5. semi-skilled - полуквалифицированный
6. pulse - вибрация, импульс
7. duration - продолжительность
8. transducer - преобразователь, щуп ультразвукового дефектоскопа
9. to impinge - ударяться, падать
10. scanning - перемещение щупа при ультразвуковом контроле

1. Read the text and find the answers to the following questions.

1) В связи с чем упоминается имя инженера Соколова?
2) В чем заключаются преимущества ультразвукового исследования?
3) Из чего состоит ультразвуковое оборудование?
4) Чем оснащены новейшие приборы, используемые при ультразвуковом исследовании?

The Russian engineer Sokolov was the first to have used ultrasonic vibrations to detect flaws in metals. And indeed, in the last few years, the use of ultrasonic has grown greatly. This method of welding examination has some advantages over other forms of examination.

The equipment is easily portable, it is safe to use, there is no radiation hazard, it has a high sensitivity factor and it is speedy. It is an economical form of non-destructive testing of welds. It can by used by semi-skilled operators in its general application.

The ultrasonic equipment consists of a pulse generator which products ultrasonic pulses of very short duration, usually in a range from 1 to 3 micro-seconds.

These pulses are sent out from a quartz crystal transducer to the medium under test. When the beam impinges upon any interface or detect, part of the energy will be reflected, received by the instrument, recorded and indicated on the ultrasonic screen. The latest productions of ultrasonic instruments are equipped with a recording device, a manual scanning is being superseded by automatic scanning.

Text 12. SAFETY RULES AND PROTECTIVE EQUIPMENT

1. safety - безопасность
2. hazard - риск
3. cutting - резка
4. fume - дым
5. to subject - подвергать
6. canvas - брезент
7. gloves - перчатки
8. apron - фартук
9. ray - луч
10. burn - ожог
11. shield - защита
12. to remove - удалять
13. goggles - очки
14. to eliminate - ликвидировать, уничтожать
15. to strike - зажигать

There are hazards in welding and cutting, just as there are hazards in any industrial operation. It is evident that the welding arc is very hot (temperature of 6,000 deg F.) and therefore it throws off both light and heat. The arc welder and the flame-cutting operator are exposed to fumes and to intense radiation of heat and light. In addition, they are subjected to the hazards of burns and electric shocks. It is necessary that proper protection be used.

Each welder must observe simple safety rules:

1. Whenever a welder is working around an open flame or an arc, he should wear clothing that will minimize the danger of fires starting. Woolen and canvas clothing, leather gloves, aprons and jackets can be worn as a protection from sparks, spatter or slag. Trousers without cuffs are advisable. No part of the bode must be exposed to arc rays, as they will cause serious burns.

2. To protect the operator's face and eyes from the direct rays of the arc, it is essential that a head shield be used. These shields or helmets are generally constructed of some kind of pressed fibre insulating material, dead black in colour to reduce reflection. The shield should be light in weight and designed to insure greatest possible comfort to the welder. Protective shields are provided with suitable coloured lens absorbing the infrared rays, the ultra violet rays and most visible rays emanating from the arc. The coloured welding lens should be protected by any ordinary clear cover glass. Besides, goggles must be worn by the welder at all times because they are necessary to protect his eyes when removing slag from welds, either before or after welding.

3. Welding should be performed in separate rooms or in locations where screening is possible in order to eliminate the danger of eye injuries from reflected or direct rays of the arc to other workers. Where many welders are working, the welder should show consideration of his fellow workmen when striking the arc.

4. Artificial ventilation should be installed to carry off the fumes and to insure good visibility when welding is done in smaller shops, and other restricted spaces, particularly inside tanks, boilers, pipe tunnels, etc. Ventilation is especially necessary if materials bearing zinc, lead or cadmium are to be welded. In the cases where adequate ventilation system cannot be provided, a proper type of filter respirator will give the welder adequate protection.

Answer the questions to the text.

1. What hazards is the arc welder exposed to in welding?
2. What can you say about welder's clothing?
3. How are the welder's eyes protected from the heat and the rays?
4. Is it dangerous to remove slag without goggles?
5. Where should screening be used?
6. Under what conditions must welding be performed?
7. Where is artificial ventilation especially necessary?
8. What should welders remember when welding?
9. What safety rules should each welder observe?

Text 13. SPOT WELDING WITH ROBOTS

1. spot welding - точечная сварка
2. to perform - выполнять
3. to decrease - уменьшать(ся)
4. extra - дополнительный
5. to sense - чувствовать, ощущать
6. appropriate - соответствующий, подходящий
7. reliable - надежный
8. accuracy - точность, правильность
   precision - точность, четкость
9. accessory - приспособление
   accessories - арматура, принадлежности
10. tip wear - износ наконечника

1. Read the text and tell a few words about the advantages of robotic spot welding systems.

Spot welding is one of the most widely accepted applications for robots. Robotic spot welding system results in improved quality, increased productivity and reduced costs. Typically, robots can perform 30 to 60 spot welds per minute.

Robotic spot welding systems lead to increased productivity and higher quality welds. So robot users find they can decrease the total number of welds required on a part because there is no longer a need for those extra welds. Product quality is the key point.

Robots can be equipped to sense which parts are coming next and automatically switch to the appropriate program. We need a robot that is highly reliable, capable of accuracy and precision repeatability and available with accessories and spot welding programs. Programs can compensate for tip wear and can adjust the angles of welding tips when necessary. Speed is important but speed between welds is more important than top speed because it more directly influences the overall efficiency of the system.

Text 14. UNDERWATER WELDING

1. underwater welding - сварка под водой
2. to strike an arc - зажигать дугу
3. resistance - сопротивление
4. bubble - пузырек
5. weld pool - сварочная ванна
6. to cause - вызывать
7. circuit - цепь
8. layer - слой

9. diving suit - водолазный костюм
10. D.C. – direct current - постоянный ток
11. A.C. – alternating current - переменный ток
12. ductility - гибкость

What is underwater welding process?

Welding under water may appear to be difficult and hazardous operation, but as a rule, it is no more difficult than surface welding.

When the welding arc is struck under water, the heat caused by the electrical resistance between the electrode and the plate causes the water immediately in the heated area to boil. This forms a bubble of steam across which the metal arc and the gases can flow to the weld pool. The intense heat causes some of the steam to dissociate into oxygen and hydrogen: these gases mix and burn.

Complete insulation of the welding circuit is essential. The electrode coatings are protected by a layer of max, varnish or cellulose. The layer also ensures that the coatings do not disintegrate while under water. Such insulation is also necessary because the diving suit has many exposed metal parts and the diver in the suit is effectively earthed by the surrounding water.

D.C. welding is employed, as it is safer than A.C. Electrolysis of the water can occur, with consequent electrolytic attraction to the metal parts of the diving suit, and to counteract to the negative pole of the supply current. Underwater welding is restricted to mild steel, but when properly carried out the weld should have about three-quarters the tensile strength, and at least half the ductility of a similar surface weld.

Text 15. THE PLASMA ARC CUTTING PROCESS – HOW IT WORKS?

1. plasma cutting - плазменная резка
2. cooled nozzle - охлажденный наконечник
3. power unit - силовая установка
4. flexible hose - гибкий шланг
5. pilot arc - вспомогательная дуга
6. jet - струя; форсунка
7. proximity - близость
8. to eject - выпускать, выбрасывать, извергать
9. to transfer - перемещать, переносить
10. to insert - вставлять, включать
11. density - плотность
12. performance - выполнение

1. Read and translate the text.

Plasma cutting is achieved by means of a concentrated electric arc in a flow of gas. The arc is concentrated by passing it through a cooled nozzle which makes it smaller in diameter and at the same time increase the voltage per unit length, so that at a given current the power in the arc is higher than in a “free” arc.

The practical realization of the process for cutting metals consists of a power supply unit, a cutting torch containing an electrode and a nozzle connected to the power unit by a flexible hose/cable set. A pilot arc is struck between the electrode and the nozzle, giving a jet of conductive ionized gas. When this is brought into the proximity of the workpiece a main arc transfers to the workpiece, increasing the power in the arc and rapidly melting the workpiece, in the path of the arc; the molten metal is ejected at high velocity of the energy in the arc. The result is high speed cutting with low heat input into the surrounding metal.

Historically the electrode has been made of tungsten and an inert or non-oxidising gas has been passed between it and the nozzle. It is possible to use air as plasma gas with a zirconium or hafnium electrode. As these elements melt at a lower temperature than tungsten they are inserted into copper holders which are cooled with water. The use of air as the plasma gas increases arc density and hence cutting performance as well as reducing operating costs considerably.

2. Answer the following questions.

1) How is plasma cutting achieved?
2) What electrodes are used in plasma cutting?

3. Make up written translation of the second paragraph.

Text 16. THE ELECTRON BEAM WELDING

1. beam - луч
2. stream - поток
3. to carry out - выполнять
4. contamination - загрязнение
5. chamber - камера
6. device - устройство
7. gun - ружье
8. means - средство
9. penetration - проникновение
10. impurity - примесь

1. Read and translate the text.

The electron beam welding process was developed in recent years. Introducing the electron beam is one of the most important developments in

welding. In this process a stream of electrons bombarding the metal surface produces heat. The process is carried out in a vacuum and is therefore extremely useful for welding metals highly sensitive to atmospheric contaminations.

An electron beam welding machine consists of an electron optical column and an evacuated chamber with devices for producing a focused beam of electrons and for holding and moving a workpiece. The electron optical column consists of four separate sections. The top section is the electron gun used for producing the beam; in the section below. the beam is focused; the third section is a microscope. In the bottom section there are means for aligning and focusing the beam on the workpiece.

Beam of electrons streams on the surface causing melting and forming a crater at the metal surface. Forming this crater results in very high penetration. Since metal is melted in vacuum, contamination from the atmosphere does not occur. The fused zone is more pure than the parent metal since impurities boil off at the high temperatures. The joints are strong and free from porosity and slag inclusions.

The electron beam equipment is quite safe for operator. There are three main advantages of electron beam welding:

1) The process is carried out in vacuum. This is useful when joining those metals and alloys which are highly sensitive to the effects of small concentrations of hydrogen, nitrogen, oxygen and other atmospheric contaminations.
2) Very great heat concentrations are obtained in the weld zone.
3) Great control of the heat input and its precise location is possible.

The main limitation of the process arise the fact that welding is performed in a vacuum. The size of the workpiece is therefore limited by the size of the vacuum chamber.

2. Answer the following questions.

1) What welding process is one of the most important developments of modern science?
2) What does a stream of bombarding electrons produce on the metal surface?
3) Is the process carried out in the atmosphere?
4) What does an electron beam welding consist of?
5) What are the main advantages of electron beam welding?

Text 17. BRAZING

1. brazing - пайка твердым припоем
2. nonferrous metal - цветной металл
3. soldering - пайка мягким припоем
4. carbon steel - углеродистая сталь

5. cast iron - чугун
6. stainless steel - нержавеющая сталь
7. grease - смазка
8. powder - порошок
9. torch - горелка

1. Read and translate the text.

Brazing is a group of metal joining processes wherein the filler metal is a nonferrous metal or alloy whose melting point is higher than 1000° F., but is lower than that of the metals or alloys being joined. Brazing, unlike welding, does not require that the surfaces of the metal be welded; it differs from soldering in that the latter method uses filler metals which melt below 700° F.

During brazing, the base metal of the two pieces to be joined is not melted: Some diffusion or alloying of the filler metal with the base metal takes place.

The brazing process is widely used because a great many metals can be effectively joined in that manner. Simple carbon steels as well as cast iron, nickel, bronze, stainless steel, high-temperature alloys may be joined by brazing.

Brazing materials commonly used fall into three broad groups: silver- and copper-base alloys, nickel-base alloys, and gold-base alloys. The melting points of these alloys range from 1150° to 2100° F.

The surface to be joined must be free of oxide and grease to obtain a good bond. It is therefore necessary either to protect the surfaces from the oxidation, which may occur during heating, or to use a flux which will remove oxide by chemical means. The flux chosen should be highly fluid at the brazing temperature, be readily floated to the surface of the brazing metal and, of course, must react with the metal oxide.

Flux may be applied to the surface being joined before brazing or as a powder with the brazing metal. After the flux is added, the joint is heated to the proper brazing temperature. Solid filler metal may be preplaced on the metal pieces and thus is melted as the metal pieces are heated, or it may be applied to the metal pieces after brazing temperature is reached.

Heating for brazing may be done by oxyacetylene torch, in a furnace, by dip technique or by electric means. The latter may be provided by the carbon arc, electric resistance or induction methods.

2. Answer the following questions.

1) What is brazing?
2) What is the difference between brazing and welding?
3) What metals and alloys may be brazed?
4) What groups do brazing materials fall into?
5) What is the main purpose of using flux in brazing?
6) What requirements must the flux meet?
7) How is heating provided?

8) Is it possible to heat metals to be brazed by induction heating?

Text 18. WHY WELDING FUMES NEEDN'T BE A PROBLEM?

1. fume - дым
2. unsafe - опасный, ненадежный
3. properly - правильно, должным образом
4. to install - устанавливать, монтировать
5. dust - пыль
6. exhaust system - система выхлопа (выпуска)
7. treated air - отработанный воздух
8. to protect - защищать
   protection - защита
9. to blow away - сдувать
10. hazard - риск

Text A

There's no reason today for welding shops to be dirty and unsafe. A properly designed and installed fume collector means a much cleaner plant and no health hazard to welders from toxic gases, fumes and dusts. The advantages of a good fume collection system are evident. If the exhaust system in a busy welding shop is turned off them the area can be filled up with fumes in a few minutes. But, when the fume collectors are working properly, there should be a complete absence of fumes. The treated air being recirculated with more than 95% efficiency for particles smaller that one micron. Decisions on the type of protection for the welder should be based on the fume measurements near the work area and also the composition of the fumes. The welder can protect himself by positioning himself so that the drafts, natural or inducted are blowing away from him. He should use a headshield rather than a handshield. The welder should wear some form of breathing protection.

Text B

1. degrease - смазка
2. paint - краска
3. to expose to - подвергать(ся)
4. extraction system - система вытяжки
5. to dispose - устранять, избавляться, ликвидировать
6. contaminant - примесь, загрязняющее вещество
7. ducted system - вентиляционная система
8. to catch - ловить, уловить
9. to escape - избегать
10. hood - вытяжной шкаф, кожух, чехол
11. inlet - впускное отверстие, впуск, ввод

The majority of work today is still on steel but there is more on aluminium and stainless steel which have more harmful fumes. A major hazard is fumes from degreases or paints. This can be avoided if this work is done in a separate area. Welding fumes are produced at the source point close to the welder where he is directly exposed to the highest concentration of fumes.

A local extraction system is essential which safely disposes of the contaminants through a ducted system before they reach the welder. The general ventilation system catches the fumes that escape local extraction. This system also protects other workers in the area and reduces the need for a supplementary general ventilation system in the plant. There are three main ways for local extraction of fumes-fixed, portable and integral exhaust.

The most important feature of a local system is that the dust and fumes should move quickly and completely from the source into the hood inlet. The hoods are used to control dust and fumes which would not naturally enter the hood.

Additional texts

Read, translate and make up written translation of the texts.

FLASH WELDING

When the edges to be welded are brought together slowly, with voltage applied, arcing takes place as first points come in contact. This violent arcing volatilizes metal and increases the distance between the edges at this point with the result that the arc moves rapidly to other points of lower resistance. Thus, the arc flits from point to point, increasing in violence with increasing speed of approach, until uniform flashing occurs over the entire area when pressure completes the weld.

SPOT WELDING

Spot welding is accomplished by placing overlapping sheets between two blunt electrodes and passing a very large current from electrode to electrode through the sheets. When the adjusting metal surfaces are heated to plasticity, pressure is applied and the sheets are welded together in a spot approximately equal in size to the end of electrode. The success of this method has, to a large extend depended on the development of suitable electrode materials. The exacting demands require high electrical and heat conductivity, fairly high yield point at elevated temperatures, a considerable degree of hardness and ability to withstand fairly high temperatures. Some very fine work in the powder metallurgy of copper and tungsten has resulted in developing the present day electrode materials.

Вашему вниманию предлагаются тексты рекламного характера. Прочитайте их и изложите содержание каждого из них письменно в виде рекламы. Реклама – это обычно короткий текст, в котором содержится основная информация о той или иной технической новинке. При написании рекламы Вы можете опускать отдельные члены предложения, например, сказуемое.

1. The computer-controlled Acu Weld automated welding system can perform a variety of arc welding processes, including GMA, GTA, plasma arc, microplasma arc, and plasma transferred arc. This provides the flexibility to produce both one-of-a-kind weldments and large production runs. Changeover from one process to another takes only minutes, and may involve only welding head replacement and uploading of the correct program. Programming is in familiar welding terms and incorporates graphics, menus, prompts and data entry error checking.

2. A fully automated system performs electrode tip dressing without interrupting production. This system maintains accurate and consistent electrode configuration, lowers costs and reduces weld time, claims the manufacturer. The process is controlled so that dressing ceases when the desired tip contour is reached.

3. The Weld Computer programmable control system for resistance welding machines performs on-line machine diagnostics before, during and after each weld. According to the company, the adaptive-process system diagnoses the quality of each weld as it is being formed, compensates for changing process conditions to control weld formation an a cycle-by-cycle basis, and provides electronic and hard-copy reports of system performance and weld integrity. The system features an electronic display and provides measurement of such variables as current, resistance and thermal expansion.

4. The model 831 fume eliminator from stubs weighs 14 ½ kg, its relatively light weight, ease of handling and positioning, making it ideal for maintenance and production welding. This new model incorporates an automatic star/stop, the unit being switched on by striking the arc and off when the arc is broken.

The stop feature can be delayed by 7-20 sec to ensure complete fume removal. As the motor runs only while welding is in progress, less energy is used, the motor life is prolonged and noise is reduced. Another automatic feature is the “filter” indicator, a lamp indicating when the filter needs replacing this light being activated by a differential pressure gauge constantly monitoring the pressure before and after the filter. There is a wide range of nozzles which fits all models, and activated carbon filters and oil film filters are available.

5. A new flux-cored welding wire that is particularly effective on rusty or oily surfaces is now available from Liquid Carbonic Inc., Scarborough. Designed for welding mild steel and medium carbon steel in flat and horizontal positions, Liquid Carbonic 74 is a highly deoxidizing fluxcored wire. It features a stable rac under all conditions, resulting in virtually no spatter, and produces a flat weld appearance with almost no ripple. Fume generation level is also low.

New products

1. New electroslag technique

The possibility of using a metal powder cored strip electrode and consumable guide plates for electroslag welding has been examined. It was found that this technique was capable of stable operation and could produce full penetration welds. The weld deposition rate was as high as 38 kg/h or 84 Lb/h. Increased travel speed and decreased specific heat input showed the promise of this electroslag variant becoming another accepted means of achieving satisfactory high speed welding. No signs of hot or cold cracking were observed and substantial grain refinement occurred in the heat-affected zone.

powder cored strip electrode - порошковый ленточный электрод
cold cracking - образование холодных трещин
grain refinement - измельчение зерна

2. Small tube welding head includes wire feeder

The Model R-1 weld head welds small diameter tubes of 0.5 to 1.5 in OD. It is designed for orbital GTAW of tubes in situations with tight radial and axial clearances. The weld head is inserted over the tube to be welded and clamped, requiring less than 10s. A cold wire feeder allows pipe/tube-to-fitting welds to be made using standard factory beveled fittings. A mechanical arc control device maintains constant arc gap control device maintains constant arc length on out-of-round pipes. The weld heads can be used with any GTAW power source.

3. Underwater plasma cutting

Among the latest developments announced by the East German Manfred von Ardenne Research Institute are two new plasma-arc cutting machines for working in underwater conditions. With this type of underwater cutting the advantages of fine beam plasma operation are combined with the advantages of water as a medium, which include the inhibition of harmful contamination, noise reduction, and lessening of ultraviolet radiation. The system for feeding in gas has been designed to produce a rotational flow/ This rotational gas flow keeps back water from the edges being cut, which results in a higher quality. These new machines can also be used for cutting in air if required.

4. Generator offers a range of welding power

The big blue 251D 250-A welding generator features a 100% duty cycle alternator design with a welding range of 40 to 400A in five separate ranges for SMAW. While welding, 3 KW/KVA of auxiliary power is available. A lokva three-phase auxiliary power kit is optional. This diesel-powered generator features direct fuel injection providing improved fuel economy, smooth operation, clean exhaust and quick starts. Optional wire feeders and guns give the machine capabilities, for GMAW and FCAW. The generators dimensions are 36 ½ x 24 ½ x 35 ¾ in.

alternator – генератор переменного тока

kit	- комплект, набор инструментов
wire feeder	- механизм подачи проволоки
20A-twenty-amperes	- 20 ампер
FCAW-Flux-cored arc welding	- дуговая сварка трубчатым электродом; дуговая сварка порошковой проволокой

Grammar Exercises

§1. Повторите Passive Voice.

Формула: to be + III форма смыслового глагола

Пассивную конструкцию рекомендуется переводить неопределенно-личной или личной формой глагола в действительном залоге, помня о том, что подлежащее пассивно.

1) The joint faces are heated to a temperature below their melting point. 2) Coalescense is produced by heating to suitable temperatures with or without the application of pressure and with or without the use of filler metal. 3) Spot welding is a process in which two metals are held between electrodes passing a heavy current through the metal to be welded. 4) Butt welding may be applied for welding pipes, tubing rods, etc. 5) An additive (присадка) is placed into the flame of the electrical arc. 6) An additive is a metal which is externally applied to the place of welding and melted to form a weld together with the material of the work. 7) Soldering is divided into two classifications: soft and hard. 8) The intense heat required to reduce metal to a liquid state, is created by an electric arc. 9) The electrode wire is fed vertically into the slag maintaining the end of the wire at a constant distance from the molten metal pool. 10) An arc is struck between two tungsten electrodes, and a stream of hydrogen is projected between them. 11) Submerged arc welding is performed with a continuous electrode and a granular flux composed with or without deoxidizers and alloying elements. 12) In automatic welding the arc is guided mechanically along the joint.

§ 2. Modal verbs

1) Alloy steel must be made by adding some alloying elements. 2) Special alloy steels can be used for parts requiring great wear resistance. 3) Some metals have to be melted at very high temperatures. 4) The filler metal must be an alloy that will produce coalescense. 5) Since both the oxygen and nitrogen of the atmosphere react with most common metals at elevated temperatures, consideration must be given to the effect of these gases in the welded metal. 6) The properties of welded sections may be determined by resorting to the testing methods applied to metals, for instance, tensile, bend and impact tests. 7) All the commonly used metals, as well as most of the exotic metals can be welded by one or more processes. 8) The liquid metal has to bridge the gap

between the parts. 9) The welder must control arc length. 10) The welder must wear protective clothing including a helmet fitted with a dark glass filter. 11) The source of energy must provide a range of voltage across the arc from 17, which is the minimum for starting an arc, to approximately 45 volts.

§ 3. Infinitive

Прочитайте и переведите предложения с инфинитивом. Помните, что перед инфинитивом в функции обстоятельства надо вводить слово «чтобы». А инфинитив в функции определения переводится придаточным определительным предложением с оттенком будущности и долженствования.

1) Electric resistance welding is a process consisting of heating metals to be welded to their plastic temperature and then applying mechanical pressure for achieving a non-detachable joining of the metals. 2) In butt welding the parts to be welded are pressed together while heat is generated by passing a heavy current though the area of the joint. 3) Electric arc welding is a process in which surfaces to be joined are fused together by the heat of an electric arc. 4) The metals to have been joined included carbon and alloy steels, stainless steel, cast iron, copper and copper alloys, nickel, nickel alloys and aluminium alloys. 5) Precise heat control is used to permit effective performance of sequential brazing or soldering operations. 6) Brazing and soldering involve fusion of joining alloy between the surface of metal parts to be joined. 7) In soldering low-melting temperature alloys permit joints of limited strength to be made at temperature below 800^{o}F. 8) A torch should have been used to heat the hard solder and object to be brazed. 9) Suitable fluxes prevent oxidation of the joining alloy and metal surface to be joined. 10) The electro-slag welding can be used to weld plates of various thickness.

§ 4. Paritciple I and II

1. Переведите предложения. в которых причастие выполняет функцию обстоятельства. Помните, что причастие I в этой функции переводится деепричастием и часто употребляется после союзов ***if, when, while***.

1) After the source of welding heat has been removed, the liquid solidifies, thus joining or welding the parts together. 2) The electrode wire is fed vertically into the slag maintaining the end of the wire at a constant distance from the molten metal pool. 3) A large current is passed through the joint until it has reached welding temperature, them pressure is applied, upsetting the joint and completing the weld. 4) It is necessary, when welding thick materials, to bevel the edges to be joined so they form a “V”. 5) An arc is established between two tungsten electrodes using alternating current. 6) Leaving the arc, the hydrogen strikes the metal to be welded, raising its temperature and melting it, using the additional heat of combination. 7) A high electric current flowing between the two lightly touching surfaces results in an extreme localization of heat at these surfaces.

2. Причастие II в функции определения переводится причастием страдательного залога с суффиксами-окончаниями -нный, -емый, -мый, -тый.

1) The history of electric arc welding begins with experiments conducted on electric arc during the first half of the 19th century. 2) The arc is formed between the work to be welded and a metal wire called an electrode. 3) In the process of shielded inert-gas metal-arc welding action is accomplished by the heat generated by an electric arc established between a consumable or a non-consumable electrode and the metal to be welded. 4) Filler metal of desired composition is automatically fed from a reel. 5) Welding speeds may be high, ranging from 10 to 14 lb of filler metal deposited per hour. 6) The heat liberated by the junction raises the temperature of the metal. 7) A covered electrode consists of a rod of metal covered with material serving electrical and metallurgical purposes. 8) Cored electrodes consist of a tube formed strip and filled with slagforming, arc stabilizing and alloying materials.

Definition of welding terms

Arc welding – a non-pressure welding process wherein the welding heat is obtained from an arc either between the base metal and an electrode, or between two electrodes.

Atomic-hydrogen welding – an alternating current arc welding process wherein the welding heat is obtained from an arc between two suitable electrodes in an atmosphere of hydrogen.

Bare electrode – solid metal electrode with no coating. Base metal or parent metal. The metal to be welded, or cunt.

Brazing – a group of welding processes wherein the filler metal is a nonferrous metal or alloy whose melting point is higher than 1000°F, but is lower than that of the metals or alloys to be joined.

Covered electrode – a metal electrode which has a relatively thick covering material serving the dual purpose of stabilizing the arc and improving the properties of the weld metal.

Deposited metal – metal that has been added by a welding process.

Electrode holder – a device used for mechanically holding the electrode and conducting current to it.

Electrode tip – a replaceable tip of metal on an electrode having the electrical and physical characteristics required for spot and projection welding.

Filler metal – material to be added in making a weld.

Flux – a fusible material or gas used to dissolve or prevent the formation of oxides, or other undesirable inclusions formed in welding.

Fusion – the melting together of filler metal and base metal, or of base metal only, which results in coalescence.

Fusion welding – a group of processes in which metals are welded together by bringing them to the molten state at the surfaces to be joined, with or without the addition of filler metal, without the application of mechanical pressure.

Gas welding – a non-pressure welding process wherein the welding heat is obtained from a gas flame.

Metal arc welding – an arc welding process wherein the electrode supplies the filler metal in the weld.

Pass – the weld metal deposited by one general progression along the axis of a weld.

Pressure welding – a group of welding processes wherein the weld is consummated by pressure.

Rate of deposition – the weight of weld metal deposited in a unit of time.

Resistance welding – a pressure welding process wherein the heat is obtained from the resistance to the flow of an electric current.

Spot welding – a welding process wherein the fusion is confined to a relatively small portion of the arc of the lapped parts to be joined.

Weld – a localized consolidation of metals by a welding process.

Welded joint – a localized union of two or more parts by welding.

Weldment – an assembly whose component parts are joined by welding.

Weld metal – the metal resulting from the fusion of the filler or base metals or both.

Welding rod – filler metal, in wire or rod form, used in the gas welding process and those arc welding processes wherein the electrode does not furnish the metal.

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АНГЛИЙСКИЙ ЯЗЫК

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