



**Некоммерческое
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**АЛМАТИНСКИЙ
УНИВЕРСИТЕТ
ЭНЕРГЕТИКИ И
СВЯЗИ**

Кафедра
иностранных
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ПРОФЕССИОНАЛЬНО-ОРИЕНТИРОВАННЫЙ АНГЛИЙСКИЙ ЯЗЫК

Методические указания для улучшения навыков перевода научно-технической литературы для студентов специальности 5В081200 – Энергообеспечение сельского хозяйства

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В методических указаниях рассматриваются основы перевода, лексические трудности перевода научно-технической литературы. Большое внимание уделяется вопросам терминологии, что дает возможность увеличить активный словарь по специальности.

Методические указания по профессионально-ориентированному английскому языку предназначены для студентов специальности «Энергообеспечение сельского хозяйства», занимающихся техническим переводом.

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Read and translate the text.

Renewable energy business model for Kazakhstan

There was a project of creation of a green village and provision of water utilizing renewable energy in Kazakhstan. Main direction of Kazakhstan alternative industry focuses on commercialization of clean energy and renewable energy development. Potential production amount of types of energy in Kazakhstan is renewable energy (wind power, solar power) was already approved by UNDP. Favorable energy resources for renewable energy generation are wind, solar, bio, geothermal heat and small hydropower rural electrification and safe drinking water supply. The project is aimed at welfare improvement of disadvantaged people. They are trying to provide possible energy solutions depending on conditions of rural regions. Kazakhstan has to join the international cooperation for reducing greenhouse gas emissions and solving the pollution problems. This contribution is meant to be a brief guide to electrical energy generation from renewable sources, with special reference to powers ratings relevant to farms which one rarely above 300-400 kW (mostly under 50-100 kW in the developed countries are much less in the developing countries). The main objective is to provide an analysis of the problems concerned with the supply of electricity which is an important element of energy self-sufficiency. The following subjects are discussed: renewable energy sources considered to be those most best suited for power supply; relevant conversion technologies to electrical energy; basic data needed for technical evaluations; application limits of sources and technologies. Special attention has been paid to problems that may arise as a result of the adoption of renewable sources. In fact, one of the reasons why these sources are not fully employed is that farmers know little about their practical application and the problems relevant to the integration between the different sources (renewable and non-renewable) representing the most common case in the practice.

Vocabulary:

Renewable energy- (energy or its source) not depleted when used (возобновляемая энергия).

Green village-green revolution-a large increase in crop production in developing countries achieved by the use of artificial fertilizers, pesticides, and high-yield crop varieties, such practice is observed as a result of a dramatic rise in concern about the environment in industrialized countries.

Hydropower rural electrification-hydroelectric power of electrification in the countryside (электрификация в сельской местности за счет гидроэлектростанции).

Farmer-a person who owns or manages a farm (фермер).

Exercise 1. Answer the following questions.

1. What is the purpose of creation of a green village?
2. Name the potential types of energy in Kazakhstan.
3. Name all the types of renewable energy.
4. Name the favorable energy resources for renewable energy.
5. What is this project aimed at?
6. What is the main objective of this project?
7. What is the reason why these sources are not fully employed?

Exercise 2. Say if the statements are true or false.

1. There was a project of creation of a green village and provision of water utilizing renewable energy in Kazakhstan. T/F.
2. Potential production amount of types of energy in Kazakhstan is renewable energy (wind power, solar power). T/F.
3. Favorable energy resources for renewable energy generation are wind, solar, bio, geothermal heat and small hydropower rural electrification and safe drinking water supply. T/F.
4. The project is not aimed at welfare improvement of disadvantaged people. T/F.
5. Special attention has been paid to problems that may arise as a result of the adoption of renewable sources. T/F.

Exercise 3. Fill in the gaps with the following words: gas emissions, clean, pollution, attention, energy ,renewable, electricity.

1. Main direction of Kazakhstan alternative industry focuses on commercialization of _____ energy and _____ energy development.
2. Kazakhstan has to join the international cooperation for reducing greenhouse _____ and solving the _____ problems.
3. Special _____ has been paid to problems that may arise as a result of the adoption of renewable sources.
4. The main objective is to provide an analysis of the problems concerned with the supply of _____ which is an important element of energy self-sufficiency.
5. Potential production amount of types of energy in Kazakhstan is renewable _____ (wind power, solar power).

Exercise 4. Translate the following sentences using the key words from the vocabulary above.

1. Renewable sources of energy such as wind and wave power are the types of energy that can be produced as quickly as it is used.

2. The production of electricity by the force of fast moving water is another example of the type of energy that can be produced as quickly as it is used.

3. Hydropower is the production of electricity by the force of fast moving water.

4. Solar energy is the type of a renewable source of energy that uses the power of the sun.

5. The area depends on agriculture for most of its income.

6. Seventy percent of the country's population practices subsistence agriculture.

Read and translate the text.

Electrical systems for agricultural buildings

Agricultural buildings-especially those used to house livestock – require special care in selecting wiring materials, wiring methods and electrical equipment because of corrosive dust, gases and moisture. These special requirements apply to adjoining areas such as feed and utility spaces as well. Electrical service — each building should have only one electrical service. The service entrance panel must have a main service disconnect and should be surface mounted on a fire-resistant surface in a clean, dry room. If the panel must be located in an adverse environment, use a dust tight, watertight, corrosion-resistant enclosure. If the panel is mounted on the outside of the building, all openings between the enclosure and building (including conduit) must be sealed with electrician's putty. Do not use silicone caulk or foam-in-place insulation products. Panels mounted in a building must have at least a 1/4 inch air space between the mounting surface and enclosure. Never recess panels into exterior walls as condensation causes accelerated corrosion. Locate all panels with at least 3 feet of clear open space in front and so the door can be opened a full 90°. The space in front of an electrical panel should not be used for storage. Easy access is required for servicing and in case of an emergency.

Vocabulary:

Livestock –farm animals regarded as an asset (домашний скот).

Watertight –closely sealed, fastened or fitted so that no water enters or passes through (водонепроницаемый).

Corrosion-resistant –the process of destroying or damaging (metal, stone or other materials) slowly by chemical action (коррозия, ржавчина).

Conduit –a tube or trough for protecting electric wiring (изоляционная трубка).

Putty –a soft, malleable grayish-yellow paste, made from ground chalk and raw linseed oil that hardens after a few hours and is used for sealing glass in window frames and filling holes in wood (замазка, шпаклевка).

Exercise 1. Answer the following questions.

1. How are agricultural buildings used?
2. What kinds of agricultural buildings require special care in selecting wiring materials, wiring methods and electrical equipment because of corrosive dust, gases and moisture?
3. Electrical service — each building should have only one electrical service, shouldn't it?
4. What enclosure should be used if the panel must be located in an adverse environment?
5. What should be done if the panel is mounted on the outside of the building?
6. What happens if we recess panels into exterior walls ?
7. Should the space in front of an electrical panel be used for storage?

Exercise 2. Say if the statements are true or false.

1. Agricultural buildings-especially those used to house livestock – require special care in selecting wiring materials, wiring methods and electrical equipment. T/F.
2. Electrical service — each building should have more than one electrical service. T/F.
3. The service entrance panel must have a main service disconnect and should be surface mounted on a fire-resistant surface in a clean, dry room. T/F.
4. Use silicone caulk or foam-in-place insulation products. T/F.
5. Recess panels into exterior walls as condensation causes accelerated corrosion. T/F.

Exercise 3. Fill in the gaps with the following words: space, corrosion, service, storage, insulation.

1. Each building should have only one electrical _____.
2. Do not use silicone caulk or foam-in-place _____ products.
3. Panels mounted in a building must have at least a 1/4 inch air _____ between the mounting surface and enclosure.
4. Never recess panels into exterior walls as condensation causes accelerated _____.
5. The space in front of an electrical panel should not be used for _____.

Exercise 4. Translate the following sentences using the key words from the vocabulary above.

1. Animals, such as cows and sheep, and birds, such as ducks, kept on a farm are called livestock.
2. Steel tends to corrode faster in a salty atmosphere.
3. A pipe or passage for water or electrical wires to go through is called conduit.
4. A soft oily substance like clay which is used especially for fixing glass into window frames or for filling small holes in wood is called putty.
5. Glass fiber is often used as roof insulation.
6. Insulation is the process when you cover something to stop heat, sound or electricity from escaping or entering, or when something is covered in this way.

Read and translate the text.

How to supply farms with power especially from renewable sources

In the first instance, it should be noted that electrical energy is – from a general point of view – the most effective and versatile energy carrier. In fact, electricity consumption is increasing everywhere in the world and in all the sectors. However, it requires expensive and sometimes high – technological plants, difficult to analyze in a few pages, due to the extreme variability from one situation to another (the spectrum of socioeconomic situations and of size of plants considered in this report is too broad).

Electricity is an essential element in all productive processes. In both agricultural and manufacturing industries, however its irreplaceable importance is often underrated. Indeed, in industrialized countries it may be observed that electricity: often does not have a significant impact on production costs; at present it easy to find; does not pose important technical problems. On the other hand, electricity becomes a priority when one of these conditions no longer holds, which is the typical situation in developing countries. The question of power supply and the choice of related technologies is generally tackled using quite different criteria, depending on the existence or absence of grids for the continuous supply of energy. In the latter case, the main problem concerns the technical aspects associated with energy self-sufficiency (i.e., essential requirements will have to be met even at high costs). In the former case, however, the following factors are important: the price of electricity; the convenience and reliability of the service; the risks connected with individual energy production.

Although food production requires relatively little energy, agriculture in the developed countries is critically dependent upon fossil energy. In developing countries conventional energy consumption is much smaller, but there is a need to modernize the sector, increasing the use of more advanced (and energy-intensive) technologies. In addition, there is increasing concern in relation to the environment and, in particular, on the long-term effect due to the global warming. In fact,

agriculture accounts for about one-fifth of the projected greenhouse gases, producing about 50% and 70% respectively, of overall methane, nitrous oxide (N₂O) and carbon dioxide emissions. Promising approaches for mitigation include more efficient conventional technologies and a large utilization of the renewable sources.

Taking into account these issues, the autonomous power supply should primarily deal with environmentally sound technologies and energy sources. In particular, the agricultural sector offers the most concrete opportunity for using renewable sources. In fact: farm power requirements are generally moderate and they sometimes match the availability of renewable sources; electricity could be required in remote areas (easy to find also in grid-connected farms) where it would be expensive to run cables from a main power supply; farmers are normally open to renewable sources and tolerate breaks in power continuity better; some renewable sources (i.e. biomass) are unique to agriculture.

On the other hand, most of the renewable sources (i. e. solar and wind energy) are intermittent and relevant energy should be stored in order to meet the requirements. Consequently, plants are expensive and often need attention. Some important farm operations are seasonable or typically 20-60 days per year (i.e. drying in mild-climate countries). Then, it is necessary to reduce investments for energy plants and structures. Some applications need a reliable power source. In this context, a double plant (conventional and renewable sources) could be required.

Vocabulary:

Versatile – able to adapt or be adapted to many different functions or activities; changeable, inconstant (разносторонний, универсальный).

Variable – not consistent or having a fixed pattern; liable to change (изменчивый, непостоянный).

Socio-economic – relating to or concerned with the interaction of social and economic factor (социально-экономический).

Irreplaceable – impossible to replace if lost or damaged (незаменимый).

Self-sufficient– needing no outside help in satisfying one’s basic needs, especially with regard to the production of food; emotionally and intellectually independent (самостоятельный, само обеспеченный).

Global warming – the gradual increase in the overall temperature of the earth’s atmosphere due to the greenhouse effect casual by increased levels of carbon dioxide, CFCs, and other pollutants (глобальное потепление).

Greenhouse gases – gases that contribute to the greenhouse effect by absorbing infrared radiation; carbon dioxide and chlorofluorocarbons are examples of greenhouse gases.

Greenhouse effect-the trapping of the sun’s warmth in a planet’s lower atmosphere, due to the greater transparency of the atmosphere to visible radiation

from the sun than to infrared radiation, emitted from the planet's surface (парниковый or тепличный эффект).

Mitigation– the action of reducing the severity, seriousness, or painfulness of something (смягчение, ослабление).

To tackle- to make determined efforts to deal with (a problem or difficult task); to initiate discussion with (someone) about a disputed or sensitive issue (браться, взяться).

Intermittent – occurring at irregular intervals; not continuous or steady (прерывистый).

Seasonable – usual for or appropriate to a particular season of the year (соответствующий сезону, своевременный).

Exercise 1. Answer the following questions.

1. How is it possible to define electrical energy?
2. What disadvantages does electrical energy have?
3. Under what circumstances does electricity become a priority?
4. How can you explain energy self-sufficiency?
5. What is agriculture dependent upon in the developed countries?
6. Why is it more effective to deal with the autonomous power supply?
7. What renewable sources of energy can you name and are they reliable sources of energy?

Exercise 2. Say if the statements are true or false.

1. Electrical energy is the most effective and versatile energy carrier. T/F.
2. Electricity consumption is increasing everywhere in the world and in all the the sectors. T/F.
3. Electricity is an essential element in all productive processes. T/F.
4. In industrialized countries it should be observed electricity has a significant impact on production costs. T/F.
5. There is an increasing concern in relation to the environment, in particular, on the long-term effect due to the global warming. T/F.

Exercise 3. Fill in the gaps with the following words: renewable sources, agriculture, sources, structures, energy.

1. The autonomous power supply should primarily deal with environmentally sound technologies and energy _____ .
2. Food production requires relatively little energy, agriculture in the developed countries is critically dependent upon fossil _____ .
3. Promising approaches for mitigation include more efficient conventional technologies and a large utilization of the _____ .

4. Farmers are normally open to renewable sources and tolerate breaks in power continuity better; some renewable sources (i.e. biomass) are unique to _____.

5. It is necessary to reduce investments for energy plants and _____.

Exercise 4. Translate the following sentences using the key words from the vocabulary above.

1. British weather is perhaps at its most variable in the spring.

2. The program aims to make the country self-sufficient in food production and to cut energy imports.

3. There are many ways of tackling this problem.

4. Although she made intermittent movie appearances, she was essentially a stage actress.

5. December brought some seasonable snow showers.

6. Biomass energy is a type of energy that uses as fuel dead plants material.

Read and translate the text.

Power production and aspects concerning the use of renewable sources

There exist several basic concepts concerning the subject. From a general point of view, the user is always willing to evaluate various energy plant designs and the final choice is not always the most economical or rational (indeed, expensive features, such as increased functional reliability, may be considered useful). When connection to a grid is possible, the supply of electricity is usually based on strictly economic considerations, while in other cases a wide range of situations may exist, which have to be examined on a case-by-case basis. This fact is extremely important when it comes to selecting energy conversion technologies. In all cases, the supply and production of power pose two types of problems: possible modification of existing energy plants; choice of the most suitable source and energy plants (in case of absence or complete reconstruction of the plants themselves).

Existing plants: criteria for action. Existing plants are frequently the basis for operation. This is the case when productive activities have been operating for some time, and all of their technical aspects have been resolved (perhaps temporarily or improperly). In this context, the various energy plants have to be re-examined for any one of the following reasons: the energy sources employed are no longer employed are no longer compatible with certain environmental aspects (e.g., the use of wood in areas subject to deforestation); the cost of produced power is too high; the negative influence of the plants on actual processing or the quantity of product obtained (e.g., an electric mill which is too small to guarantee consistent level of production).

Experience has shown that: in the first case, the energy source has to be replaced by one that is more suitable; in the majority of cases, this requires the choice of a new energy plant; in the second case, the economic incidence of the energy may be related to the high cost of the source (e.g., small quantities of diesel fuel that have to be transported for long distances) or the excessive employment of labor. Cost reductions may be obtained: by changing the energy source (again requiring a new plant); by increasing the yield (or level of automation) of existing plant; in the third case, solution of the problem may require the repair of a plant malfunction or, one again, a new plant.

In all three cases, before formulating a work hypothesis, it is good practice to determine: the consumption levels of the technologies currently in use for the supply of electricity, broken down by energy source (e.g., grid, diesel fuel for the generation set, etc.); the real requirements, which are generally lower than consumption.

The next step is to determine whether consumption levels and requirements are compatible (or acceptable) in terms of: current energy costs; conversion yields (if they are too low, it is always worthwhile to consider alternative plants, at least from an economic standpoint); environmental impact (generally based on emissions and/or wastes of some types of energy transformations).

The proposed method of analysis can lead to two results: the existing plant (which may already employ renewable sources) merely requires limited modifications that do not alter its basic set-up. In this case, it is always a good idea to evaluate the benefits that could be provided by rationalizing the users (e.g., by modifying the time-table of daily operations), to obtain: a reduction in the number of user points, improved employment of labor, etc.; the existing plant requires radical alteration. In this case, the situation is similar to the one described below.

Vocabulary:

A grid – a network of cables or pipes for distributing power, especially high-voltage transmission lines for electricity (сеть электропередач).

Conversion – the process of changing or causing something to change from one form to another (преобразование, конверсия).

Compatible – (of two things) able to exist or occur together without problems or conflict (совместимый).

Incidence – Physics the intersection of a line, or something moving in a straight line, with a surface (падение, наклон, охват, сфера действия).

Diesel–electric denoting or relating to a locomotive driven by the electric current produced by a diesel-engined generator.

To yield – to produce or provide (a natural, agricultural, or industrial product) (приносить, производить, уступать).

Malfunction – (of a piece of equipment or machinery) fail to function normally (неисправно действовать).

Impact – the action of one object coming forcibly into contact with another; a marked effect or influence (удар, воздействие, влияние).

To alter – to change in character or composition, typically in a comparatively small but significant way (изменяться).

Exercise 1. Answer the questions.

1. What fact is extremely important when it comes to select energy conversion technologies?
2. What two types of problems do the supply and production of power pose?
3. Why do the energy plants have to be re-examined?
4. What has experience shown?
5. How may cost reductions be obtained?
6. What is the next step?
7. Is it always worthwhile to consider alternative plants?
8. What two results can the proposed method of analysis lead to?

Exercise 2. Say if the statements are true (T) or false (F).

1. The supply and production of power pose two types of problems: possible modification of existing energy plants; choice of the most suitable source and energy plants (in case of absence or complete reconstruction of the plants themselves). T/F.
2. The various energy plants have to be re-examined for any one of the following reasons: the energy sources employed are no longer employed are no longer compatible with certain environmental aspects (e.g., the use of wood in areas subject to deforestation). T/F.
3. The energy source has to be replaced by one that is more suitable. T/F.
4. Cost reductions may not be obtained anyhow. T/F.
5. The proposed method of analysis cannot lead to any results. T/F.

Exercise 3. Fill in the gaps with the following words: sources, problems, reductions, hypothesis, benefits.

1. The energy _____ employed are no longer compatible with certain environmental aspects .
2. The supply and production of power pose two types of _____.
3. Cost _____ may be obtained.
4. Before formulating a work _____, it is good practice to determine it.
5. It is always a good idea to evaluate the _____ that could be provided by rationalizing the users.

Exercise 4. Translate the following sentences using the key words from the vocabulary above.

1. A grid is a system of wires through which electricity is connected to different power stations across a region.
2. Solar power is the conversion of the sun's energy into heat and electricity.
3. This software may not be compatible with older operating systems.
4. Shortly before the crash the pilot had reported a malfunction of the aircraft's navigation system.
5. The anti-smoking campaign had made quite an impact on young people.
6. Generator is a machine which produces something, especially electricity.

Read and translate the text.

Some words from the national electrical code

Agricultural buildings- especially those used to house livestock-require special care in selecting wiring materials, wiring methods and electrical equipment because of corrosive dust, gases and moisture. These special requirements apply to adjoining areas such as feed and utility spaces as well.

As part of planning an agricultural building, farmer should confer with any power supplier's agricultural or customer service representative. They can help assure proper planning of all components of the electrical system. Advance knowledge of your plans also allows your power supplier to schedule other necessary changes, such as installing a larger transformer, to meet your expanded needs.

Farmers should be familiarized with the following useful instructions of National electrical code. The NEC establishes minimum standards required to assure safety and reduce risk of electrical system failure. Wiring materials and devices should bear the label of a recognized testing agency such as the Underwriters Laboratories (UL), Electrical Testing Laboratories (ETL) or Factory Mutual (FM). (Note: these are the only testing agencies currently recognized by the Nebraska State Electrical Board). Installation in accordance with the NEC means all 115 Vac (volts, alternating current) electrical appliances require both a ground (safety) and grounded (neutral) conductor. Grounds and neutrals must be kept electrically separate everywhere except in the main service panel. All equipment must be double insulated or wired with a grounding (safety) conductor regardless of operating voltage. Conduit may not be used as the only grounding conductor in agricultural buildings.

If some problems occur, it is necessary to ask for an assistance of a professional electrician. Use of a licensed electrician is recommended. Licensed electricians are more likely to be familiar with requirements of the NEC and accepted good practices.

Vocabulary:

Livestock – farm animals regarded as an asset (домашний скот).

Wire – metal drawn out into the form of a thin flexible thread or rod; a length or quantity of wire used to carry an electric current, for fencing, etc (провода, провод, проволочная сетка).

Corrosion – destruction or damage of (metal, stone or other materials) slowly by chemical action (коррозия, ржавчина).

Insulate – prevent the passage of electricity to or from (something) by covering it in non-conducting material (изолировать, отделять).

Conduit – a tube or trough for protecting electric wiring (изоляционная трубка).

Exercise 1. Answer the questions.

1. Give a description of agricultural buildings.
2. What are agricultural buildings used for?
3. How are these special requirements applied to?
4. Whom do you need to confer with as part of your planning?
5. What is national electrical code?
6. What can you say of the profession of an electrician?

Exercise 2. Say if the statements are true or false.

1. Agricultural buildings are especially that are used to house livestock. T/F.
2. Agricultural buildings require special care in selecting wiring materials, wiring methods and electrical equipment because of corrosive dust, gases and moisture. T/F.
3. Advance knowledge of your plans does not allow your power supplier to schedule other necessary changes, such as installing a larger transformer, to meet your expanded needs. T/F.
4. Wiring materials and devices should bear the label of a recognized testing agency. T/F.
5. Licensed electricians are more likely to be familiar with requirements of the NEC and accepted good practices. T/F.

Exercise 3. Fill in the gaps with the following words: electricians, equipment, buildings, materials, agency.

1. Licensed _____ are more likely to be familiar with requirements of the NEC and accepted good practices
2. Agricultural _____ are especially that are used to house livestock.
3. Wiring materials and devices should bear the label of a recognized testing _____.
4. Agricultural buildings require special care in selecting wiring _____, wiring methods and electrical _____ because of corrosive dust, gases and moisture.

5. Potential production amount of types of energy in Kazakhstan is renewable _____ (wind power, solar power).

Exercise 4. Translate the following sentences using the key words from the vocabulary above.

1. Don't touch those wires whatever you do.
2. Wire service is an organization that supplies news to newspapers, radio and television stations, etc. using an electrical communication system.
3. Wiring is the system of wires that carry electricity in a building.
4. If metal corrodes, or if something corrodes it, it is slowly damaged by something such as rain or water.
5. Steel tends to corrode faster in a salty atmosphere, such as by the sea.
6. There was a lot of corrosion on the bottom of the car.

Read and translate the text.

Electrical energy in agriculture

Electrical energy in agriculture began its triumphal procession after the Second World War. Electrical energy in agriculture has improved the performance of the agricultural sector in the shortest possible time. Electrification, heating facilities and technical equipment modernized industry and gave it new capacity for further development. But its boom didn't last long and today using energy in agriculture faces numerous problems, these problems require complex solutions on the part of the authorities and management companies. In addition, agriculture was faced with the global dependence on energy resources and their deficit, as well as the constant increase in fuel prices, which affects the cost of production.

At present, the electrical energy in agriculture has embarked on re-equipment and modernization. There are some governmental programs in this field as well as that owners of agricultural facilities have been trying to resolve some issues by actively introducing new technologies for energy efficiency. Today, no one doubts that the energy in agriculture needs a partial re-equipment to alternative energy sources that contribute to energy conservation and environmental problems of various kinds, besides farmers actively started to use energy-saving lamps and technologies which consume less energy than before.

It has been implemented waste-free production, where for instance waste from the production of juice is widely used to produce biogas. With the help of the smart electric grids (they are represented as a single automated system) energy in agriculture can be transformed.

Vocabulary:

Agriculture – the science or practice of farming including cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool and other products (сельское хозяйство).

To electrify – to pass an electric current through; to convert (a machine or system, especially a railway line) to the use electrical power (электризовать, электрифицировать).

Heating facilities – equipment or devices used to provide heat, especially to a building (обогревание, отопление).

To re-equip – to provide with new equipment (переоснащать).

Alternative energy – energy fueled in ways that do not use up the earth's natural resources or otherwise harm the environment, especially by avoiding the use of fossil fuels or nuclear power (альтернативная энергия).

Energy-saving – an economy of energy (экономящий энергию).

To implement – put (a decision, plan, agreement, etc.) into effect (выполнять, осуществлять, проводить в жизнь).

Waste-free production – to produce without using unwanted or unusable material, substances or by-products (не загрязняющий).

Biogas –gaseous fuel, especially methane, produced by the fermentation of organic matter.

Electric grids – networks of cables or pipes for distributing power, especially high-voltage transmission lines for electricity (сеть электропередач).

Exercise 1. Answer the questions.

1. When was the triumphal procession of electrical energy in agriculture?
2. What factors modernized industry and gave it new capacity for further development?
3. Did its boom last long?
4. What are the numerous problems that require complex solutions?
5. Is it profitable to use alternative sources of energy? Why?
6. Give the examples of waste-free production.
7. Explain how the electric grids look like.
8. What is biogas?

Exercise 2. Say if the statements are true or false.

1. Electrical energy in agriculture began its triumphal procession before the Second World War. T/F.
2. Electrical energy in agriculture has improved the performance of the agricultural sector in the shortest possible time. T/F.
3. But its boom lasted long. T/F.
4. At present, the electrical energy in agriculture doesn't have any changes. T/F.
5. With the help of the smart electric grids energy in agriculture can be transformed. T/F.

Exercise 3. Fill in the gaps with the following words: the shortest , solutions, electrification , dependence, grids.

1. Electrical energy in agriculture has improved the performance of the agricultural sector in _____ possible time.

2. _____ , heating facilities and technical equipment modernized industry and gave it new capacity for further development.

3. These problems require complex _____ on the part of the authorities and management companies.

4. Agriculture was faced with the global _____ on energy resources and their deficit.

5. With the help of the smart electric _____ energy in agriculture can be transformed.

Exercise 4. Translate the following sentences using the key words from the vocabulary above.

1. The east coast railway line has been electrified.

2. She electrified her audience with her vivid stories.

3. A large house like this must be expensive to heat.

4. Alternative energy is energy from moving water, wind, the sun and gas.

5. The energy generated by the windmill drives all the drainage pumps.

6. When we say energy-efficient we mean using little electricity, gas, etc.

Read and translate the text.

Wiring location and cable

Surface mount all wiring (cables and conduit) to facilitate maintenance and inspection, minimize rodent damage and reduce moisture migration. Under no circumstances should wiring be concealed within the walls or extended into the attic or ceiling spaces. Holes through the inside finish material and vapor barrier destroy the effectiveness of the vapor barrier. Attach surface wiring in machinery storage facilities, free-stall barns, and similar structures under or to the sides of trusses and to the sides of poles and columns. Provide protection (conduit, wood overlay, etc.) for all wiring within 8 feet of the ground or floor surface. In horse and goat barns, provide protection to a height of at least 10 feet. A general rule of thumb is to provide protection for all equipment within two times animal height above the floor. Cable — underground feeder — cable is required in all damp, corrosive areas of agricultural buildings. Weatherproof connectors and fittings are a required part of the system. Attach cable with nonmetallic cable straps and corrosion-resistant nails. Type NM — nonmetallic— and NM-B cable may not be used in agricultural buildings. (Note: Romex® is a common trade name for NM cable.)

Vocabulary:

Conduit –a pipe or passage for water or electrical wires to go through (изоляция трубка).

To facilitate-to make possible or easier (обеспечивать).

Moisture – liquid such as water in the form of very small drops, either in the air, in a substance, or on a surface (влага).

Free-stall barns –free-standing barns, barns that stand alone (отдельные сараи).

Rule of thumb –a practical and approximate way of doing or measuring something (опытным путем).

Exercise 1. Answer the questions.

1. What is the proper way of all wiring mounting?
2. Is it possible to conceal wiring within walls?
3. What is the damage of holes through the inside finish material?
4. What kind of protection should be for all the wiring?
5. What is a general rule of thumb to provide protection for all equipment?
6. Is cable required in all agricultural buildings?
7. How should cable be attached?
8. What type of cable may not be used in agricultural buildings?

Read and translate the text.

What is NEC?

During June 1982, electrical system failures resulted in animal losses in excess of \$100,000 on three Nebraska swine farms. In 1983, more than \$45,000 worth of feeder pigs were electrocuted on another Nebraska farm. Dairy and beef animals also have been electrocuted. A survey of more than 400 Nebraska farms revealed that over 50 percent have problems due to poor on-farm wiring. A more recent survey of 14 farms revealed none with 100 percent properly wired buildings. Many had conditions which were serious threats to safety. Nebraska insurance companies report that about 70 percent of all on-farm fires involve the electrical system. Losses have been so extreme that some insurance companies will not write insurance on a building not wired to the *National Electrical Code* (NEC) minimum standards. The NEC is part of Nebraska State law. All wiring legally must meet NEC minimum requirements—even if it's not inspected. Agricultural buildings—especially those used to house livestock—require special care in selecting wiring materials, wiring methods and electrical equipment because of corrosive dust, gases and moisture. These special requirements apply to adjoining areas such as feed and utility spaces as well. As part of your planning, confer with your power supplier's

agricultural or customer service representative. They can help assure proper planning of all components of the electrical system.

Advance knowledge of your plans also allows your power supplier to schedule other necessary changes, such as installing a larger transformer, to meet your expanded needs. A companion NebGuide, *Electrical Systems for Agricultural Buildings (Checklist)*, G87-846, is an aid in evaluating your electrical system. Item numbers are keyed between the two NebGuides for easy reference.

Vocabulary:

Electrocute-to kill someone by causing electricity to flow through their body

Failure – when something does not work, or stop working as well as it should (авария).

Adjoining areas –areas that are near, next to, or touching (прилежащие районы).

Insurance companies – (страховые компании).

Representative –someone who speaks or does something officially for another person or group of people (представитель).

Exercise 1. Answer the questions.

1. What happened in June 1982?
2. What was the reason of failures?
3. How large were the losses according to the insurance companies?
4. What is NEC?
5. What changes should be done according to NEC?

Read and translate the text.

Inspection

No matter who installs an electrical system, the possibility of an error or oversight always exists. In Nebraska, representatives of the State Electrical Division (State Electrical Board, 800 South 13th Street, Suite 109, P.O. Box 95066, Lincoln, NE 68509-5066, Phone 402/471-3550) are located around the state and are available to conduct on-farm inspections for a nominal fee. Inspection of agricultural installations is not mandatory under Nebraska law. However, inspection is required by some power suppliers. Under present law, the inspectors can only serve as advisors but their training and experience are valuable in identifying possible problem areas. Use of the services of an electrical inspector is strongly recommended. Use of UL listed equipment and installation in accordance with the National Electrical Code helps assure safety and a long service life. In case of electrode conductor properly clamped to the Electrode we may say the following.

This conductor and grounding electrode must be installed and protected to minimize the risk of physical damage. The resistance from the grounding electrode to the surrounding soil must be 25 ohms or less. Where multiple ground rods are used to reduce resistance to ground, separate the rods at least twice the length of the ground rods and interconnect with a No. 6 copper conductor and clamps approved for burial.

Vocabulary:

Install –to put a machine or a piece of equipment into position and make it ready to use (установить).

Oversight –a mistake made because of a failure to notice something (недосмотр, упущение).

Rods –a long thin pole made of wood or metal (клин, стержень).

Exercise 1. Answer the questions.

1. Is there the possibility of oversight and why?
2. What kinds of qualities should the inspector have?
3. What should be done to minimize the risk of physical damage?
4. What are the numerous problems that require complex solutions?
5. What are the standards for the resistance?
6. What should be done with rods and what sort of rods should they be?

Read and translate the text.

Conduit

Use nonmetallic conduit where multiple circuit conductors are needed or where wiring is subject to physical damage. Schedule 40 conduit is appropriate for general wiring. Where mechanical protection is needed, use Schedule 80 conduit. Surface mount all conduit. Where conduit passes between areas with different temperatures, the conduit must be sealed with electricians' putty, or equivalent. Do not use silicone caulk. Metallic conduit is not appropriate in most agricultural buildings. Gases and moisture in agricultural buildings lead to rapid deterioration of all types of metallic conduit. Electrical Nonmetallic Tubing (ENT) is not permitted in agricultural buildings. To prevent breakage of conduit or equipment due to thermal expansion-contraction of nonmetallic conduit, use one 6-inch expansion joint per 50 feet of conduit. Additional expansion joints are: install ground rods and grounding electrode conductors to minimize the risk of damage. (Note: Backfill hole and cover ground rod after inspection and approval.) required on installations subject to extreme temperature variations. An expansion joint is required between all rigidly mounted equipment, such as light fixtures.

Vocabulary:

Conduit –a pipe or passage for water or electrical wires to go through (изоляционная трубка).

Schedule –an official list of things (график, расписание).

Silicone caulk – (шпаклевка, замазка).

Fixture –a permanently fixed piece of furniture in a house which would not be taken by someone (приспособление, неподвижная/ закрепленная деталь).

Exercise 1. Answer the questions.

1. What type of conduit should be used?
2. What type of conduit is appropriate for general wiring?
3. When must the conduit be sealed with electricians' putty?
4. Is it allowed to use silicone caulk?
5. Is metallic conduit appropriate in most agricultural buildings?
6. What is ENT?
7. What should be done to prevent breakage of conduit?
8. What are additional expansion joints?

Read and translate the text.

Branch circuits and equipment grounding

Use a larger copper wire for all 115 volt general purpose circuits. The bigger one should only be used for circuits with known, controlled loads. Conductors servicing continuous loads (such as heat lamps and fans) must be larger. The allowable current for continuous loads is only 80 percent of the conductor rating. Provide individual branch circuits or individual fuses for all permanently installed equipment such as fans, heaters, augers, etc. A disconnecting means is required within sight of and within 50 feet of all equipment. Locating the disconnect and fuse within 10 feet of the controlled equipment is recommended. Match branch circuit conductors and over current protection devices to the equipment being controlled. Overload protection is needed in all motor installations.

All equipment and all metallic components of the electrical system and building within 8 feet of the floor or soil surface must be bonded to the grounding electrode system. A grounding electrode (rod) at the site of a piece of metallic equipment is not permissible, except as a complement to a grounding conductor (bare copper or green insulation) from the service distribution panel. The soil is not permitted to be used as the only path for grounding circuits. All high pressure power washers must also be equipped with ground fault circuit interrupters for added protection. Equipment grounding conductors (bare copper or green insulation) must be kept electrically separate from other grounded conductors (neutrals, white or gray insulation) in the electrical system except at the service entrance. The

equipment grounding conductor is intended to carry current only in the event of an electrical fault.

Vocabulary:

Copper wire – (медная проволока).

Auger –a tool consisting of a twisted rod of metal fixed to a handle, used for making large holes in wood or in the ground (сверло, бурав).

Permissible –allowed (допустимый, позвоительный).

Grounding –earth, a wire that makes a connection between a piece of electrical equipment and in the ground, so the user is protected from feeling an electric shock if the equipment develops a fault (заземление).

Exercise 1. Answer the questions.

1. What size should the copper wire be?
2. What types of conductors can you name?
3. What permanently installed equipment can you name?
4. How must equipment grounding conductors be kept?
5. When is the equipment grounding conductor intended to carry current?

Read and translate the text.

Boxes and fixtures, switches and receptacles

Corrosion of metallic conduit, boxes and fixtures frequently leads to electrical system failure. Boxes and fixtures made of a nonmetallic material or corrosion-resistant stainless steel, i.e., non-magnetic, are recommended for all agricultural buildings and are required in any building housing livestock or containing corrosive dust. Select equipment designed for use with dust tight and watertight conduit and cable fittings. Plastic boxes designed for use in residential or other clean, dry environments are not permitted in agricultural buildings.

Equip all devices with dust tight and watertight corrosion-resistant, gasketed covers. When mounted on a vertical surface, hinge the cover at the top. Single pole switches installed with spring-loaded covers must be installed so they are "off" when in the down position. A preferred alternative is to use switches with external levers or weatherproof pushbutton covers. Surface-mounted fixtures made of thermosetting plastic (e.g., Bakelite®) are not permitted in agricultural buildings. Install combination fuse and switch devices in nonmetallic boxes with covers. Circuit breakers may not be used as general on/off switches except to control fluorescent lights. Circuit breakers used in this way must be approved for switching duty and must be marked "SWD". Thermostats must be made of corrosion-resistant material and must be in watertight and dust tight enclosures. Some thermostats in

nonmetallic enclosures are not UL listed. Use of such equipment could affect insurability.

Vocabulary:

Frequently – often (часто).

Stainless steel – a type of steel containing chromium, which does not chemically react with air or water and does not change its color (нержавеющая сталь).

Gasket – a flat piece of soft material or rubber that is put between two joined metal surfaces to prevent gas, oil or steam from escaping (прокладка, тесьма).

Fluorescent – fluorescent lights are very bright, tube-shaped electric lights, often used in offices (флюоресценция).

Exercise 1. Answer the questions.

1. What is the cause of electrical system failure?
2. What boxes and fixtures are recommended for all agricultural buildings?
3. What sort of equipment should be selected?
4. Are plastic boxes permitted in agricultural buildings? Why?
5. What kind of switches should be used?
6. What should be installed in nonmetallic boxes with covers?
7. What are the functions of circuit breakers?

Read and translate the text.

Lighting fixtures

Use dust and moisture tight nonmetallic fixtures with shatterproof, vapor tight globes for incandescent light bulbs. Observe wattage limitations of fixtures when planning the lighting system. Special high temperature wire is required in some incandescent fixtures. Except where frequent on/off cycles occur (for example, in enclosed walkways between buildings) use of fluorescent lights is recommended. Fluorescent lights are more energy efficient and produce about three times more light per unit of electricity than incandescent lights. Select fluorescent light fixtures made of corrosion-resistant materials with gasketed covers. Fixtures with fiberglass or aluminum enclosures and Lexan® covers are recommended. Do not use fixtures made of ABS plastic and with acrylic diffusers in buildings where chemicals and high pressure hot water cleaning and sanitizing systems are used. Special cold-start ballasts are needed for fluorescent lights used in buildings such as machine sheds, free-stall dairy barns and swine growing/finishing buildings.

Whenever possible, cable or conduit should enter boxes and panels from the side or bottom. This will minimize the dripping of condensation onto electrical

contact surfaces and reduce corrosion. Boxes for single outlets and switches may have to be wired from top and bottom. Alternatively, such boxes can be mounted sideways and wired from each side.

Vocabulary:

Shatterproof –shatterproof glass or plastic, etc. is made so that it will not break into small pieces (не бьющийся).

Enclosure –an area surrounded by fences or walls (ограждение).

Incandescent lamp—a lamp, producing a bright light from a heated filament or other part (лампа накаливания).

Sanitize –to make something completely clean and free from bacteria.

Exercise 1. Answer the questions.

1. What fixtures should be used for incandescent light bulbs?
2. What should be done when planning the lighting system?
3. What are fluorescent lights?
4. What sorts of fixtures are recommended?
5. When are special cold-start ballasts needed? Why?
6. What can minimize the dripping of condensation onto electrical contact surfaces and reduce corrosion?
7. How may boxes for single outlets and switches have to be wired?

Read and translate the text.

Mounting of electrical devices

Surface mount all electrical devices in agricultural buildings should be carried out in the following way: a minimum clearance of 1/4 inch is required between all boxes and the mounting surface to reduce entrapment of moisture, dust, and other corrosive materials. Never recess boxes or other electrical equipment enclosures into exterior walls. The inability to adequately insulate between the backside of electrical panels and boxes and outside walls allows condensation to form in the devices and accelerates corrosion of electrical equipment.

Fixture mounting height — locate switches, receptacles, and other devices 4-6 feet above floor level to minimize potential damage from animals and equipment. Additional protective devices and methods are required where electrical equipment is accessible by animals such as cows, horses and goats. Avoid excessively high mounting heights which limit access for servicing or access and operation during an emergency.

Vocabulary:

Clearance –the distance or space that is needed for one thing to avoid touching another thing (зазор, промежуток).

Adequately –enough or satisfactory for a particular purpose (достаточно, адекватно, компетентно).

Condensation – the drops of water that appear on cold windows, or other surfaces, as a result of hot air or steam becoming cool (конденсация, уплотнение).

Accessible –able to be reached or easy got (доступный).

Exercise 1. Answer the questions.

1. Why is a minimum clearance of 1/4 inch required between all boxes and the mounting surface?

2. Is it possible to recess boxes or other electrical equipment enclosures into exterior walls?

3. What allows condensation to form in the devices and accelerates corrosion of electrical equipment?

4. What should be done for fixture mounting height?

5. Why is it necessary to locate switches, receptacles, and other devices 4-6 feet above floor level ?

6. What additional protective devices and methods are required?

Read and translate the text.

Suspended appliances and motors

Support suspended lighting fixtures, heating appliances and other electrical devices by chain or other mechanical method. Do not support any equipment by the power cord, conduit or electrical cable. The support should extend from a solid mounting at the ceiling and be attached to the appliance.

Heat lamp sockets — use porcelain sockets for all lamps designed to produce heat. Fixtures made of rubber and plastic are not acceptable.

Motors — totally enclosed motors designed for farm service are essential for long life in the severe environment of agricultural buildings, especially feed processing areas and facilities used to house animals. Permanent wiring of all fixed motors is recommended. Do not connect permanently installed equipment with plug and cord. The continually open receptacles destroy the integrity of the electrical system. Wire movable equipment and equipment which vibrates during operation with flexible cord (Type SE or SJE) or liquid tight flexible nonmetallic conduit. Use conductors with stranded wires. Wire outdoor equipment such as floating pumps or aerators with flexible cord. Do not use submersible pump cable because sunlight which is (ultraviolet radiation) quickly destroys the insulation of such cables.

Vocabulary:

Suspended lighting – (подвесное освещение).

Appliance – a device, machine or piece of equipment, especially an electrical one that is used in the house, such as a cooker or washing machine (прибор, устройство).

Socket – the part of a piece of equipment, especially electrical equipment, into which another part fits (розетка).

Pump – a piece of equipment which is used to cause liquid, air or gas to move from one place to another (насос).

Aerator – a piece of equipment that adds air to water or soil (аэрагор).

Exercise 1. Answer the questions.

1. How is it necessary to support suspended lighting fixtures, heating appliances and other electrical devices?

2. Is it allowed to support any equipment by the power cord, conduit or electrical cable?

3. How should the support extend?

4. What are the instructions for heat lamp sockets?

5. What are the instructions for motors?

6. Is it permissible to connect permanently installed equipment with plug and cord?

7. What types of conductors should be used?

8. Why mustn't we use a submersible pump cable?

Read and translate the text.

Electrically heated stock waterers, grounding of building components

All electrically heated stock waterers must have a grounding conductor from the service entrance to the waterer to assure a low impedance (resistance) path and sufficient current flow to trip a circuit breaker or blow a fuse in the event of an electrical fault. A grounding electrode may be installed at the waterer for added protection. However, a grounding electrode is not, by itself, sufficient. A switch with a properly sized fuse adjacent to the waterer offers convenience and additional safety. Install a ground-fault circuit-interrupter device near the waterer for added safety and protection. Electric heat tape is commonly used to prevent freezing of exposed water lines. To reduce the risk of electrocution, use only three-wire (third wire grounding) heat tapes.

Grounding of building components — all metallic building components within 8 feet of the floor or soil surface must be grounded (NEC 250-42). This includes all materials such as siding, structural frames, rain gutters, feeders, grates, gates, farrowing crates, free-stall dividers, milking parlor equipment, etc. Although these

components may have individual ground rods, they must also be bonded to the electrical grounding electrode system servicing the building. Metallic parts not likely to become energized need not be grounded.

Vocabulary:

Impedance – (импеданс, полное сопротивление).

Fuse –a small safety part in an electrical device or piece of machinery which causes it to stop working if the electric current is too high, and so prevents fires or other dangers (предохранитель).

Adjacent –very near, next to, or touching (соседний, смежный).

Exercise 1. Answer the questions.

1. Must all electrically heated stock waterers have a grounding conductor?
2. Why must all electrically heated stock waterers have a grounding conductor?
3. Where may a grounding electrode be installed?
4. What are the numerous problems that require complex solutions?
5. Is a grounding electrode, by itself, sufficient? Why?
6. What is electric heat tape commonly used to?
7. What should be done to reduce the risk of electrocution?

Read and translate the text.

Conductor attachment to building, standby power

Where building openings are used for the transfer of materials between the inside and outside of the building, the point of attachment of conductors must be out of reach. The point of attachment of overhead wires should not be closer than 10 feet to either side of the opening and 3 feet above it. Under no circumstances should electrical conductors be attached below such openings. Attach overhead wires in a way that ensures portable elevating equipment can be maneuvered into openings without making contact with overhead wires.

Most livestock operations require standby electrical power. A double-throw transfer switch must be installed so the generating equipment is isolated from incoming power lines at all times. This protects servicemen from any on-farm generated power feeding back over the supply lines and eliminates potential damage to the generating equipment when normal power is restored. The transfer switch also provides a convenient means to disconnect power to the entire farmstead for servicing and in case of an emergency. Consult your local power supplier when planning and before using a standby power system. Both you and your power supplier benefit from cooperative planning to assure all needs are met.

Consult your local power supplier when planning and before using a standby power system. Surge arrestors — surge or lightning arrestors are necessary to safely lead transient over voltages to ground and to protect equipment. Such protection becomes increasingly important as the use of computers and other electronic equipment and controls increases. Install surge and lightning arrestors on the outside of boxes and panels.

Vocabulary:

Attachment –an extra piece of equipment that can be added to a machine (приставка).

Maneuver –a movement or set of movements needing skill and care (маневр).

Standby –something which is always ready for use, especially if a regular one fails (БЫТЬ НАГОТОВЕ).

Exercise 1. Answer the questions.

1. What must the point of attachment of conductors be where building openings are used for the transfer of materials between the inside and outside of the building?
2. What should the point of attachment of overhead wires be?
3. Should electrical conductors be attached below such openings?
4. Do most livestock operations require standby electrical power?
5. How must a double-throw transfer switch be installed? Why?
6. How should you act when planning and before using a standby power system?
7. What are surge arrestors?
8. How should we install surge and lightning arrestors?

Read and translate the text.

Lightning protection

Lightning protection —equip buildings, silos, feeding systems, etc., with a lightning protection system. A complete system includes air terminals ("lightning rods"), connecting cables and clamps, and grounding electrodes. Lightning protection system grounding electrodes may not be used as the required grounding of the electrical system. However, the lightning protection system grounding electrodes and cables must be bonded to any metallic equipment (e.g., building siding) within 6 feet of lightning protection system components. Do not allow aluminum grounding cables to come in contact with painted, galvanized, or bare steel roofing, elevator leg supports, etc. Aluminum cables may not be used within 18 inches of the soil surface. All lightning protection systems should be made with

components bearing a UL label and installed by an installer qualified to apply for a UL "Master's Label" for the completed installation.

Extraneous voltage — in addition to good wiring practices, to reduce the possibility of extraneous voltage problems, in some instances a four-wire service for 230 volt single phase installation may be desirable. If a four-wire service is used, grounded neutral conductors and equipment grounding conductors must be kept electrically separated except at the main farm service disconnect. The grounding conductor must be copper if placed underground. A four-wire service is not recommended except where it has been shown to be appropriate through proper testing. However, service entrance panels at all individual buildings still require connection to a grounding electrode and the bonding of all branch circuit equipment grounding conductors to the grounding electrode. Equipping milking centers with an equipotential plane and voltage ramp will reduce the risk of extraneous voltage problems affecting cows during milking.

Fences and cow trainers — locate electric fence chargers at least 10 feet away from buildings to reduce the risk of damage by lightning. Do not connect the output ground terminal of any charging device to the electrical system.

Vocabulary:

Clamp –a device, made of wood or metal, which is used to hold two things together tightly (зажим, скоба).

Extraneous –not directly connected with or related to something (посторонний, чужой).

Output –an amount of something produced by a person, machine, factory, country, etc. (выпуск, продукция, производительность).

Exercise 1. Answer the questions.

1. How can lightning protection be described?
2. What does a complete system include?
3. How must the lightning protection system grounding electrodes and cables be bonded?
4. What are the strictest instructions with aluminum cables?
5. How should all lightning protection systems be made? Why?
6. What is extraneous voltage?

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Жанна Борисовна Ержанова

ПРОФЕССИОНАЛЬНО-ОРИЕНТИРОВАННЫЙ АНГЛИЙСКИЙ ЯЗЫК

Методические указания для улучшения навыков перевода научно-технической литературы для студентов специальности 5В081200 – Энергообеспечение сельского хозяйства

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